THE ASSOCIATION OF FAMILY MEAL CONSUMPTION, COMMUNICATION SATISFACTION WITH PARENTS AND WEIGHT PERCEPTION IN FINNISH ADOLESCENTS

School Health Promotion study

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ABSTRACT

Perceiving weight incorrectly has been an emerging health concern (Kaltiala-Heino et al., 2003). Family meal consumption may increase adolescents normal weight perception (Mikkilä et al., 2003), and therefore family meal can aid adolescents to identify their weight versus the peers. An awareness of fundamental benefits on normal weight perception may encourage healthy mealtime in families.

The aim of this cross-sectional research was to see if there exists an association between the family meal consumption and the perceived under - or overweightness among 14- to 16-year-old Finnish adolescents, separately for boys and girls. Mikkilä´s et al. (2003) cross-sectional research associated family meals with normal weight perception. The current research was conducted to compare present circumstances with Mikkilä's (2003) results and also to examine the association between communication satisfaction with parents, family meals and weight perception.

This Master's thesis investigates data from the national School Health Promotion study 2013 (n=99 478) (National Institute for Health and Welfare, 2014). The chosen study population consist of 8th and 9th graders. The cleaned data in logistic regression analysis included 71 288 study-subjects.

Firstly, the association between the family meals and weight perception consumption was tested by cross-tabulations and the statistical analyses were carried out by Chi-Square test. Family meal was statistically significantly associated with lower odds of perceived under - or overweightness. Secondly, the independent association between weight perception and other variables were examined by logistic regression. This analysis was adjusted for socioeconomic and life-style variables, as well as communication satisfaction with parents. Not a proper family meal was associated with an under- or overweightness perception of body weight also in the multivariate models. This study showed a stronger association between the communication satisfaction with parents and the normal weight perception than the association of the family meal to the normal weight perception.

KEYWORDS

Adolescent, communication satisfaction with parents, family meal and weight perception.

1. ABBREVIATIONS

Body Mass Index (BMI)

Health Behaviour in School-Aged Children (HBSC)

International Obesity Task Force (IOTF)

Physical Activity (PA)

School Health Promotion study (SHP)

Socioeconomic Status (SES)

United Nations International Children's Fund (UNICEF)

World Health Organization (WHO)

2. INTRODUCTION

Umuntu ngumuntu ngabantu.
(A person is a person because of other people)
Popay et al., 2008

The relation between adolescents family meal consumption and weight perception is of particular interest due to earlier study findings on the association between family meals and weight perception (Mikkilä et al., 2003). While several international studies demonstrate the benefits of family meal to adolescents (Burgess-Champoux et.al., 2009; Fulkerson et al., 2009; Goldfarb et al., 2014; Gillman et al., 2000; Neumark-Sztainer et al., 2003; Utter et al., 2013b) the consumption of family meal varies among developed countries (Ministry of Youth Development, 2014). The current theory explaining the relationship between family meal and weight perception is not well established although statistical association has been approved (Mikkilä et al., 2003). There is a significant gap in time since Mikkilä's (2003) research, and therefore it is of interest to learn how family meal currently associate with weight perception. Furthermore, Mikkilä (2003) did not consider how adolescents' perceived communication with the parents is associated with weight perception. The current study addresses these questions.

Parental modelling behaviour and active discussion around the dining table may not only prevent future problems with adolescents' weight perception; but also promote healthy meal patterns (Compan et al., 2002; Fulkerson et al., 2010; Larson et al., 2007). The power of food upbringing can be seen as healthy food behaviour (Fulkerson et al., 2006). Parents choose which food is available at home, as well as decide whether food is prepared and eaten together or not. Suggestion is that family meal decreases weight dissatisfaction due to parental monitoring (Mikkilä et al., 2003). Accordingly, families can be empowered and educated further on the benefits of family meal aiming at better mealtime functioning, such as enhanced communication and regular food habits.

Another factor affecting family meals today are the diverse types of families. Families that eat together are different in structure (nuclear families) than the families who skip family meals (Goldfarb et al., 2014). However, it has been argued that family structure

is not a significant variable in adolescent family meal frequency (Levin et al., 2012b), yet family functioning is (Berge et al., 2013; Levin et al., 2012a).

The population health relevance of this topic is the relation of family meal and weight perception to the adolescents' health. Researchers believe that a reduced awareness of one's own weight may transfer into adulthood as social problems and cumulative weight issues that in turn contribute to other health complications (Eaton et al., 2005; Jansen et al., 2008). Family meals may prevent adolescents weight dissatisfaction (Mikkilä et al., 2003), thus they increase the awareness of weight. Therefore, more nutritional advice for families is needed in order to prevent the diet related diseases (Hammons and Fiese, 2011; WHO, 2012). The rational of this research is to find whether family meal is directly related to adolescents' weight perception. The following literature review was conducted in order to identify what is known and not necessarily apprehended of the association between family meal and adolescents' weight perception.

3. ADOLESCENTS' WEIGHT PERCEPTION

3.1 Weight related health prospective in adolescence

The next chapter describes aspects of perceived health that are specific in adolescence. Adolescence is a time for the transition from childhood to adulthood emotionally, physically, psychologically and economically (UNICEF, 2012). Foundations for a healthy adulthood are constructed in the vulnerable, although adaptable puberty. The opportunity to influence health-enhancing behavior in adolescence must be reinvigorated. In order to prevent unhealthy food practices in adolescence focused action plans are needed (WHO, 2012). The research indicates that adolescents' perceiving overweightness may become overweight later on (Klein et al., 2008). Therefore, the weight perception is important when promoting adolescents' health.

The perception of health differs in population groups. Health is an individual experience that cannot be measured objectively. In a subjective model, 'bad health' is related to individual experience of one's own health when estimated and compared to age-associates (Välimaa, 2000). Some are more anxious than the others concerning health, and therefore the individual life experiences contribute to health. Gender differences are foremost important to understand. Välimaa's (2000) results highlighted the importance of understanding adolescents' everyday life and personal health experiences. It is important to understand adolescents' point of view in health matters when promoting health in different settings, such as home, doctors or school (Välimaa, 2000).

Self-esteem and the social position of the family were important variables in all adolescent perceived health models that Välimaa (2000) researched. Adolescents define their health by symptoms and their perception of health is based on perceived physical health, social health (e.g. status) and sensation of good feeling (Välimaa, 2000). Under- or overweight adolescents may feel content with their weight, whereas attractive normal weight adolescent may feel unsatisfied with their weight (Ojala et al 2012, Kaltiala-

Heino et al. 2003). The good feeling that adolescent gain from peer's recognition may endorse unhealthy weight desires, because adolescents often correspond to their peers.

Under-standing the age related lifestyle, perception of health and family background are significant when researching adolescents' health (Välimaa, 2000). Low perceived health is connected to a low educational level in adulthood (Koivusilta et al., 2003); therefore weight perception and adolescent's school success may associate. Psychosomatic symptoms, a low perceived socioeconomic status (SES), a low level of success in school and a broken family are associated to the lower health perception in adolescents' (Koivusilta et al., 2003). Conversely, perceived support and good relations with friends and family are significant variables for adolescents' good perception of health (Välimaa, 2000). Therefore, these variables are important in weight perception research.

Adolescents' weight impediments are caused by overweightness or dieting related underweight (Ojala et al. 2012), partly induced by the peers. Furthermore, overweight adolescents health impediments are often caused by teasing and social exclusion (Ojala et al. 2012). Consequently, adolescents may impersonate their appearance and follow their peers. These may cause admiration of thinness or one might overlook overweightness.

In general, adolescents' wellbeing is developing into a healthier direction in Finland, considering that the adolescents report better relationships with parents and the weight increase is ceasing (Luopa et al., 2014). However, the new social culture online may also create further pressure on the appearance for adolescents, which may affect weight perception in unidentified ways. Adolescents are spending more time in online services where looks are important and bound to criticism (Elgar et al., 2014).

Moreover, technological transformations with the social culture online instigate families to further involvement in online services and activities. In addition, transformations in the social culture prompt families to further engage in activities, such as hobbies. Consequently, families tend to have less time for the preparation of food and each other during the meals. Regardless of the urgency of life, the understanding of adolescents' everyday life situations is important when promoting health (Välimaa, 2000). Therefore, the time offered at family meals may endorse adolescents' health.

According to a UNICEF study (2012), suggestive methods are needed to comprehend the rights of adolescents. The Ministry of Social Affairs and Health (2011) recommended strengthening the participation and partnerships of the adolescents and families in different services. Involvement empowers the person and increases life control, well-being and health (Ministry of Social Affairs and Health, 2011). Välimaa (2000) underlined the importance of understanding adolescent's perception of health when promoting health for adolescents. Aforementioned adolescent health perception features must be kept in mind when investigating weight perception.

Encouraging health interventions in early adolescence can prevent negative outcomes in late adolescence (UNICEF, 2012). Fostering healthy family meal habits in adolescence encourage healthy lifestyle (Al Sabbah et al., 2009, Berge et al., 2013, Mikkilä et al., 2003). In the current study, the protective effects of evening family meal are studied as one aspect of the adolescents' immediate family environment. The results of the family meal connection to adolescent's weight perception are discussed further in chapters 9.3-9.6.

3.2 Definition of weight perception

Perceived weight is only one field of extensive perceived wellbeing. Perceived weight is a subjective experience of the suitableness of one's own weight (Ojala et al. 2012). Especially in adolescence the image of the under- or overweightness of one's own body is unrealistic (Ojala et al. 2012, Välimaa, 2000). The concept definition for weight perception used here is one's own awareness of his/her mass (Yost et al., 2010). Perceived weight is an essential part of the body image and some research defines it as the awareness of one's body weight (Yost et al., 2010). In other words, perceiving weight is the process of someone identifying and distinguishing realism of one's own weight and that is how the term 'weight perception' is used in the current study.

Weight perception is a part of a larger body perception (body image) that manifests as body dissatisfaction in a negative form (Ojala et al., 2012). In some research, possibly

for the sake of simplicity, everything but the normal weight perception is called weight dissatisfaction (Mikkilä et al. 2003). However, it cannot be supposed that respondents were dissatisfied although the answer was something else than the normal weight perception (underweight, overweight or obese). Respondents may have perceived their weight right or stand content with the weight, which is something else than within the normal weight range. The current research uses the term *perceived under- or overweightness* to describe weight perception.

The conception of body image is associated to the SES context (such as unemployment parents') where adolescents function (Ojala et al. 2012). According to Välimaa (2000), observing one's own appearance and comparing oneself to role models is orientating oneself to peers and becoming acquainted with self. The environment clearly affects weight perception and those who experience neglect from the parents are experience more weight dissatisfaction (Ojala et al., 2012). Body dissatisfaction appears in adolescents who strongly assimilate to cultural beauty ideals strongly and girls who that desire to be attractive are clearly more affected more by the body image problems (Ojala et al., 2012). However, overweightness was accepted among girls if the person endorsed it (Välimaa, 2000).

The body image can be seen as continuum; in the other end is acceptance, whereas as in the other extreme is negative body image (Ojala et al., 2012). Adolescents can become fixated with looks and feel ugly (Ojala et al., 2012). Body dissatisfaction can be directed to the entire body or just weight, and it can exist in a moderate or obsessive form. The physical changes in puberty and overweightness can trigger the body dissatisfaction. Family coherence significantly influences the body image significantly (Ojala et al., 2012), which supports the importance of togetherness offered during the family meals.

In the following paragraphs, weight perception research questions in other research questionnaires are shown. To assess the perceived weight, the question was asked whether adolescents perceived themselves as very overweight, somewhat overweight, normal, somewhat underweight, or very underweight (Kaltiala-Heino et al., 2003). Similarly, Mikkilä et al. (2003) requested: 'What do you think about your body weight?' (1) Very overweight; (2) overweight; (3) normal weight; and (4) underweight or very underweight.

Eaton et al. (2005) measured weight perception by the question: 'How do you describe your weight?' Response options were (1) very underweight; (2) slightly underweight; (3) about the right weight; (4) slightly overweight, and (5) overweight.

Another study used the BMI z-score that was derived using the UK growth reference (Viner et al. 2006). Perception of weight was labelled as appropriate or inappropriate depending on the BMI (Viner et al., 2006). An 'appropriate' perception was labelled if one perceived about the right weight. Viner et al., (2006) also asked three other questions on dieting practices and weight perception: 'Given your age and height, would you say that you are:' (1) about the right weight, (2) too heavy, (3) too light or (4) not sure? and 'At the present time, are you:' (1) trying to lose weight, (2) trying to gain weight, or are you (3) not trying to lose weight?

Hayward et al. (2014) instead used a specifically designed Adolescent Behaviour, Attitudes and Knowledge Questionnaire in which the following questions were asked: 'How would you describe your weight?' (1) Very underweight, (2) slightly underweight, (3) about the right weight, (4) slightly overweight, and (5) very overweight. Three categories were constructed (about the right weight, underweight, overweight) (Hayward et al., 2014). Hayward's et al. (2014) study questionnaire was especially made for a weight perception study.

Therefore, all the studies presented above used similar questions to ask weight perception, although the topics of the studies were different. The perception of weight is complex issue that is altered via adolescent's development, psychosomatic capabilities and weight status (Eaton et al., 2005; Viner et al., 2006). Perceived weight is studied as a part of weight-related health behaviour.

3.3. Adolescent weight perception in numbers

The next chapter presents weight perception statistics for Finnish adolescents. In a previous research, approximately a third of the girls perceived overweightness,

compared to a fifth of the boys (Mikkilä et al., 2003; National Institute for Health and Welfare, 2014; Välimaa, 2000; Kautiainen, 2008). Girls' perceived overweight and boys' perceived underweight increases in puberty (Ojala et al., 2012). While there is no major difference in weight perception among vocational school students during this period (2008-2013), the vocational school students perceive their state of health worse compared to high school and elementary school students (Luopa et al., 2014; National Institute for Health and Welfare, 2014).

Adolescents' weight perception differs slightly (under 5%) between the regions in Finland (Luopa et al., 2014). The prevalence of perceiving *underweight* (among elementary school students) has decreased for both genders from 2000 (12%) to 2013 (9%), whereas perceiving obvious *overweightness* has increased slightly from 2000 (5%) to 2013 (6%) (National Institute for Health and Welfare, 2014). The prevalence of perceiving *underweight* was higher for boys (12%), compared to girls (7%) (National Institute for Health and Welfare, 2014).

In 2013, boys perceived *overweightness* (20%) less frequently than girls (38%) (National Institute for Health and Welfare, 2014). This indicates that boys are less concerned about being overweight. In addition, the prevalence of perceiving normal weight among *elementary* school students has increased from 57% in 2000 (n=93 695) to 62% in 2013 (n=97 584) (National Institute for Health and Welfare, 2014). In comparison, the perception of normal weight among the *high* school students in 2000 was 61% (n=50 015) and in 2013 67% (n=48 090) (National Institute for Health and Welfare, 2014). Therefore, the normal perception of weight is increasing among high school students. In comparison, *vocational* school students' perception of normal weight remained similar in 2008 (59%, n=40156) and 2013 (58%, n=33917) (National Institute for Health and Welfare, 2014). Vocational school students have been taken part in the School Health Promotion (SHP) study since 2008.

As peers grow in size, adolescents' perception of overweightness may be influenced (Kaltiala-Heino et al., 2003). The number of adolescents who perceive overweightness decreased over time both among normal and overweight adolescents. Perceived overweightness in overweight boys in 1979 was 66%, whereas in 1999 it was 56%. In comparison, perceived overweightness in overweight girls in 1979 was 98%, whereas in

1999 it was 79%. The weight perception accuracy for boys declined in the age of 14-16, whereas for same aged girls it augmented. The trend that overweight adolescents perceived themselves as normal (Kaltiala-Heino et al., 2003) seems detrimental for health; because weight related chronic diseases are also ignored.

3.4 Determinants of weight perception

3. 41 Gender

The weight perception determinants that were expended in the current research are explored in the following section. Gender disparities in health are common among adolescents'. Boys in Finland have more destructive life style compared to girls. For example, in 2013, the elementary school boys smoke tobacco, have tried illegal drugs and use alcohol to get heavily drunk more frequently than the elementary school girls (Luopa et al., 2014).

There are major gender differences in understanding the overweightness, comparing the overweight boys (62-69%) and overweigh girls (89-100%) who reported themselves too heavy during the years 1994-2010 (Ojala et.al., 2012). Boys who also have more excessive weight issues in Finland (National Institute for Health and Welfare, 2014), have an excessively positive body image compared to more critical girls (Cromley et.al., 2012; Kaltiala-Heino et al., 2003, Kautiainen, 2008; Mikkilä et al., 2003).

Additionally, adolescent girls perceived themselves more often overweight compared to boys (Kaltiala-Heino et al., 2003). There was a slight increase in perceived underweight for boys. Nevertheless, the decreasing trend of perceiving overweightness was detected in normal and overweight groups among the boys (Kaltiala-Heino et al. 2003). Since a clear proportion of overweight boys seems to have a too positive body image (Kaltiala-Heino et al., 2003; Ojala et.al., 2012), the weight related health issues might be ignored among boys in Finland.

The corresponding research found that half as many girls (39%) thought that they are overweight when compared to boys (19%) (Mikkilä et al., 2003), although boys seem

less disturbed about the weight issue. In addition, 25% of the obese 14-to 16-year-old boys in Finland thought that they are of desirable weight. In comparison, only 13% of the obese girls perceived their weight desirable. Moreover, girls more frequently considered themselves overweight in all weight categories (Mikkilä et al., 2003).

Furthermore, weight dissatisfaction was common (girls 46% over the boys 34%) (Mikkilä et al., 2003). More than half of the underweight girls thought they are overweight. Weight perception was normal among half of underweight boys, but only among a third of the underweight girls. Boys in Finland seem to have a more positive weight perception in general, no matter what the weight range is. Furthermore, in the normal weight category for boys, weight perception was more optimistic (69%) than among the normal weight girls (58%) (Mikkilä et al., 2003).

The weight perception related in the UK research found out that only one-sixth of the overweight and half of the obese boys recognised their overweightness; whereas one-third of the overweight and two-thirds of the obese girls recognised their overweightness (Viner et al., 2006). The girls in the UK are also more accurate in weight perception than the boys. Females have more pressure to appear slim, which may explain the more extreme weight perception.

However, some research does not support the idea of idealization of thinness as a risk factor for adolescents weight concerns that result in eating disorders (Kaltiala-Heino et al., 2003); female adolescents seem to be more alarmed concerning weight and more despondent about it in general (Kaltiala-Heino et al., 2003; Luopa et al., 2014). Sixteen percent of the elementary school girls reported moderate or severe anxiety, comparing to six percent of the elementary school boys (Luopa et al., 2014). Overall, the girls report more symptoms and mood related disorders (Luopa et al., 2014), which may affect the results. Therefore, analyses in the current study are carried out separately for boys and girls.

Furthermore, the poor educational level of parents and the reduced economic situation of the family were associated to weight dissatisfaction, especially on behalf of the girls (Mikkilä et al., 2003). School success was related to weight dissatisfaction particularly

among the girls, however for boys the association vanished controlling for other SES variables and lifestyle variables (Mikkilä et al., 2003).

3.42 Family meals

A family meal is the main exposure variable in the current study that is discussed in detail in the chapter four and five. Family meal is associated to better weight perception (Mikkilä et al., 2003). Neumark-Sztainer et al., (2006), found that dieting adolescents who possessed a distorted weight perception had worse eating habits. Weight perception is more significantly associated with food behavior and food choices than the actual weight (Mikkilä et al., 2003). The promising effect of family meals on weight perception is significant and it may enhance adolescents' ability to a normal weight perception (Mikkilä et al., 2003). Having no family meals or a school lunch had a significant association with weight dissatisfaction in both genders (Mikkilä et al., 2003). Boys have family meals more frequently compared to girls (Berge et al., 2013, Mikkilä et al., 2003), although weight dissatisfaction was more common for the girls who had no family meal.

3.43 Communication satisfaction with parents

Al Sabbah's et al. (2009) research of communication and weight perception was based on the cross-sectional study Health Behaviour in School Aged Children (HBSC) from 2001-2002. In this research, Finnish boys communication with parents was not related to weight satisfaction, whereas for the Finnish girls' the association between the communication with parents association and the weight satisfaction was strong (Al Sabbah et al. 2009). Finnish girls results on the association between communication with the parents and the weight satisfaction were similar to results in many other countries (Belgium, Estonia, France and Norway).

However, in Norway, Russia, Sweden and the United States the boys' communication with their father was related to weight satisfaction, whereas in Estonia and Finland it wasn't (Al Sabbah et al., 2009). This implies that Finnish boys weight satisfaction causes may differ from most other country boys. Overall, conclusion was that the difficulty talking to the mother was associated with weight dissatisfaction among girls,

yet not among boys, whereas the difficulty of talking to the father was associated to weight dissatisfaction for both boys and girls (Al Sabbah et al. 2009).

Above all, adolescent's emotional and social skills upsurge in the communication during meals (Berge et al., 2010). Therefore, also the weight perception may improve. Parents who require feedback and respond to their adolescents are most likely to provide structure needed during the family meal (Berge et al., 2010). Similarly, parents' response may structure healthy weight perception. Overall, the quality of the relationship to the parents has an impact on adolescent's health, satisfaction and behaviour (Musick and Meier, 2012).

3.44 Body mass index

The BMI levels and body-fat percentage of an adolescent depend on gender, age and maturity (Sweeting, 2007). The BMI, weight perception, and weight perception accuracy are significantly positively associated with the desire to loose weight among adolescent girls (Yost et al., 2010). The research suggests using weight perception accuracy with body mass BMI in weight-loss interventions (Kaltiala-Heino et al., 2003; Yost et al., 2010). This is due to differences in reporting anthropometric weight and height (Kaltiala-Heino et al., 2003). Large surveys often query the weight and height that are needed in the calculation of the BMI, but the responses are often self-reported.

Weight is often underreported and height overreported (Kaltiala-Heino et al., 2003; Kautiainen et al., 2002). Therefore, the BMI alone is not accurate and the measures are only estimates. For example, a muscular athlete has a heavier lean body mass, although the BMI may incorrectly demonstrate overweightness (Viner et al., 2006). Inversely, the BMI is a convenient measure of the body fat and it is used in many studies as an index of obesity (Cole and Lobstein, 2012; Kautiainen et al. 2002).

The BMI is used in the current study to investigate the relation of weight to weight perception, however the weight perception accuracy is not used in the main analysis. BMI calculation is a ratio of height in the power of two over the weight (BMI=kg/m) (Cole and Lobstein, 2012). There were only minor changes in the reformulation of the

IOTF's BMI cut-offs to the existing knowledge, however the modifications improved the comparison in international cut-offs (Cole and Lobstein, 2012).

Although weight had a significant independent association with weight satisfaction, compared to risk relations of other variables (*family's structure; parent's education; family' economic situation; school success; PA; the usage of alcohol; smoking; school lunch*); the weight was a small risk for weight dissatisfaction (Mikkilä et al., 2003). On the other hand, adolescents who perceive themselves overweight may become overweight (Klein et al., 2008) and overweight individuals may develop weight dissatisfaction. Furthermore, perceiving overweightness may also contribute to underreporting of weight, yet the relationship between the actual weight and the perceived weight relationship is significant when describing whether the adolescents maintain a normal weight or not (Kaltiala-Heino et al., 2003).

Moreover, weight is related to weight perception and actual body weight was strongly associated with weight satisfaction in adolescents (Mikkilä et al., 2003). A correct weight perception in adolescence is important since the misconception of under- or overweightness may lead to health problems later on in life. Under- or overweight adolescents who ignore unhealthy weight may disregard weight related diseases as an adults.

A study in Finland proposed that normal weight pupils were most satisfied with their weight, whereas the obese were the least satisfied group (Mikkilä et al., 2003). The weight of adolescents has increased in the last decade together with intensifying obesity (Kautiainen et al., 2002). Therefore, the social environment may have changed the reaction to weight and adolescents weight perception has transformed. Overweightness is also linked to low SES and economic problems (Kautiainen et al., 2009; Mikkilä et al., 2003).

3.45 Physical Activity

The terms physical activity (PA), exercise and physical fitness are used often interchangeably, however they differ in the meanings. All forms of movement that contribute to overall energy expenditure, such as cleaning and walking to school may be

considered as PA. The term exercise tends to be used when organised strenuous exercise is articulated. Furthermore, the term physical fitness term is typically used when measuring the levels of fitness, which is not the purpose of this study.

Overall, Kautiainen et al. (2002) discussed that lifestyle activity, such as walking or riding a bike to and from school has decreased. In 2013, only around thirty percent of the elementary school students reported taking part in an hour of exercise or sports a day that involved sweating or getting out of breath (Luopa et al., 2014). PA should be encompassed in all weight related studies, since those two are always intertwined.

Exercise, weight perception and food behaviour appear to syndicate, since exercising individuals are inclined to eat healthily (Berge et al., 2013) and perceive themselves bodily satisfied (Mikkilä et al. 2003). Research shows that exercise prevents unhealthy weight gain (Greaney et.al., 2009; Neumark-Sztainer et.al., 2006) and therefore exercise is implied to weight perception. Inactive boys are more likely to be obese (Mikkilä et al., 2003) and the body satisfaction increases among exercising adults (Neumark-Sztainer, 2006).

However, some research did not find an association between normal weight perception and the high PA levels (Viner et al., 2006), although other research found an association concerning the high PA and the normal weight perception in adolescents (Mikkilä et al., 2003). Overweightness in adolescent boys and girls is associated with decreased PA, whereas weight dissatisfaction is only related to decreased physical activity in boys after adjusting to SES, food behaviour and lifestyle variables (Mikkilä et al., 2003).

3.46 Sociodemographic variables

Socioeconomic health gaps are broadening globally (Popay et al., 2008). Numerous factors influence population behaviours, such as employment and education (WHO, 2012). Unemployment indicates health inequalities. Accordingly, families' SES variables are indispensable when analysing adolescents weight perception. Regarding the elementary school students reporting, the parents' unemployment during the past year had large regional differences (Lapland being the highest unemployment) in Finland (Luopa et al., 2014). In addition, the perceived economic status of the family

(good, some problems, severe problems) was strongly related to weight perception in both genders (Mikkilä et al., 2003). Therefore, adolescents in certain areas may have further distorted weight perception, and therefore they require further assistance.

Weight dissatisfaction and a lower SES background are related to each other (Mikkilä et al., 2003), and therefore certain SES (e.g. educational level of parents, economic status of family) variables indicate weight perception. A high educational level of the parents and school performance were associated with weight satisfaction only among girls. However, the higher the parents' education was the less overweightness occurred in both genders. In addition, adolescents who perceived their weight as normal believed that their family is financially stable (Mikkilä et al., 2003).

Previous weight related studies have pointed that weight prevention programmes, addressing societal and individual level issues, are required (Kautiainen, 2008). Therefore, targeting more individualised approaches via health services, along with stimulating population behaviours may be useful (WHO, 2012), also for adolescents' weight perception.

3.5 Potential consequences of weight perception

3.51 Ignored weight and unhealthy weight control

The next chapter examine health disadvantages of the distorted weight perception in adolescents. Positive outcomes of accurate weight perception in adolescents are improved weight control behaviours; better mental health; higher self-esteem; enhanced communication with parents; greater level of PA and a healthier dietary behaviour (Al Sabbath et al., 2009; Cromley et al., 2013; Ibrahim et al., 2014; Jansen et al., 2008; O'Dea and Amy, 2011; Roberts and Duong, 2013). On the contrary, a discontent weight perception may be detrimental for adolescents' health. Above outcomes are associated to one another. Some of these outcomes are further addressed in the following chapter.

Mikkilä et al., (2003) found that weight perception is a more important predictive health indicator than weight, since an abnormal weight perception is associated to harmful habits (e.g. smoking and fast food consumption). On the contrary, Hayward's et al. (2014) finding suggests that those adolescents who ignored their own weight may be healthier, since they perceive themselves happier (Hayward et al., 2014). The Health Related Quality of Life (HRQoL) scores showed that those who accurately perceive their weight according to the BMI also appear to have *lower* HRQoL scores (Hayward et al., 2014). Therefore, the research argues that those whom perceive themselves *incorrectly* normal weight have a *higher* quality of life.

However, the happier overweight adolescents also ignore weight related diseases that normally rupture later on in adulthood. On the other hand, slight overweightness in adolescence may not carry a health risk. Hayward et al. (2014) found that underweight boys (25.6%) perceive themselves more often underweight than girls (13.9%) that is explained by boys desire for increasing lean muscle mass. Therefore, a distorted weight perception that boys experience may not be health compromising. However, boys have body image problems similarly to girls (Hayward et al., 2014), just for a different reason.

Adequate social support to prevent negative weight stigma during developmental period in adolescence is required (Hayward et al., 2014). Accordingly, adolescents may benefit from weight ignorance due to non-stigmatisation (Hayward et al., 2014). However, non-stigmatisation of overweight companions may be due to an increasing number of overweight adolescents in a peer group (Kaltiala-Heino et al., 2003). Although the acceptance of all sizes is indispensable, the personal weight must be comprehended. While the adolescent population has gained weight, the populace is less concerned about the weight increase (Kaltiala-Heino et al., 2003); and therefore adolescents may also overlook weight related illnesses.

Nevertheless, during weight interventions must deal cautiously with the weight perception topic, since the desire to loose weight is suitable only if there is a need for it. Dieting among peers or pressuring parents may cause more weight dissatisfaction (Ojala et al. 2012). For example, continuously dieting parent must consider the message that their dieting carries for adolescent. The outcomes of incorrect weight perception are

linked to unhealthy weight control practices in several studies (Ibrahim et al., 2014; Neumark-Sztainer, 2002).

Dieting parents must consider the consequences of their personal dieting on the adolescents. Distorted weight perception was associated with the Extreme Weight-Management Practices (EWPs), especially among high-school girls in the US (Ibrahim et al., 2014). Boys also engage in EWPs (Ibrahim et al., 2014) and EWPs indicate that there are other psychosomatic issues that distort the perception of weight.

It is apposite to mention that perceived overweightness in the initial consultation predicted overweight at the follow up (Klein et al. 2008). A longitudinal study on US 7th to 8th graders proposed that perception of overweight may predict becoming overweight, whether the adolescent was dieting or not (Klein et al. 2008). Therefore, the incidence of perception of overweightness is relevant when preventing and treating weight perception related problems.

Moreover, health risk concerns related to overly positive weight perceptions in overweight adolescents are genuine. The 'It's your move' - study (n=2954) found that *moderately overweight* children would benefit from nutritional education, since they tend to underestimate their weight (Fredrickson et al., 2013). Resembling Finnish results (n=51 892) found underestimation of weight among those who are overweight in a secular trend study (Kaltiala-Heino et al., 2003). Therefore, incorrect weight perception is a health risk.

Weight is a delicate issue when instructing adolescents in their weight status. The research reveal that adolescents might be satisfied with their weight - regardless of their weight (Cromley et al., 2012; Kaltiala-Heino et al., 2003). In other words, adolescents may stay in an unhealthy weight range although they are satisfied. The research has shown that 63.7% of overweight students considered themselves as "about right" although they are overweight (O'Dea and Amy, 2011). Therefore, ignorance of one's own overweightness emerges a health risk.

Underweight adolescents may perceive normal weight and desire for unhealthy weight. This indicates that adolescents need more support in recognising their weight and in

understanding the risks of being outside the normal weight range. Moreover, thin children (aged 6-18) are less likely to desire getting fitter, yet tend to consider their weight as not normal (O'dea and Amy, 2011). Accordingly, weight perception among thin children's weight perception seems more definite, although they may remain too content with being in an unhealthy weight range.

3.52 Self-esteem and psychological outcomes

A negative consequence of an abnormal weight perception is low self-satisfaction. Adolescents who didn't perceive themselves as being normal weight appear to be at greater risk of depressive symptoms in both genders (Roberts and Duong, 2013). Self-esteem is significantly lower especially in obese boys (Viner et al., 2006). Further study has approved that feeling fat is related to the psychological wellbeing (Jansen, 2008). The effects of incorrect perception of weight can be detrimental. Studies have also indicated an important link between perceived weight, depression and suicides (Eaton et al., 2005; Roberts and Duong 2013).

Adolescents who perceive their body size to an extreme are at increased risk of negative psychological outcomes (Eaton et al., 2005). A self-reported BMI is significantly associated with suicide ideation. The association of BMI with suicidal behaviour is weaker when *perceived weight* is incorporated in the multinomial logistic regression testing; therefore students with extreme perceptions of their body size are at increased risk for suicide ideation and attempts. Those who perceived themselves slightly underweight, slightly overweight, and very overweight had greater adjusted odds of suicide ideation (Eaton et al., 2005).

Overweight adolescents behaviour can change for worse along with the weight related understanding, and they may suffer from lowered body satisfaction, depression, anxiety and anger (Cromley, 2012). Weight related understanding increases along with age, which means that adolescents recognise own weight more often than small children. Adolescents are exposed to misperception of weight. Low self-esteem was related to misperceived overweightness in moderate BMI percentile categories for both female and male adolescents (Perrin et al., 2010).

A distorted weight perception may foster harmful behaviour in adolescence, even though no real weight problem exists. Research suggest that also thin children (aged 6-18) may be at risk of body image problems, as only 57.4% of thin students consider themselves as being 'about right' compared with 83.1% of normal weight students and 63.7% of overweight students (O'Dea and Amy, 2011).

Weight perception relates to family customs that exist in the society and cultural structure. Overweight and obese Bangladeshi adolescents had *less* psychological distress over normal weight adolescents (Viner et al., 2006), since the weight culture in Bangladesh may approve of overweightness. Therefore, overweightness may traditionally link to prosperity in certain countries. Black African and British white overweight or obese adolescents had higher prevalence of psychological distress (Viner et al., 2006), even if overweightness in the UK is not as acceptable as in Bangladesh.

However, overweight black African girls had higher self-esteem than other overweight adolescents (white British, Bangladeshi, black Caribbean and British) (Viner et al., 2006). Ethnic differences exist in weight perception and as discussed above, some races may accept a rounder figure. Very overweight or very underweight white students had greater odds of suicides compared to black and Hispanic students (Eaton et al., 2005). Perceiving oneself very underweight was also associated with suicides among black and Hispanic students (Eaton et al., 2005). The self-esteem is important in preventing poor weight perception.

The role of peer status and victimisation may determine how adolescents perceive their weight negatively. Perceived popularity among school peers, as well as being disliked at school, was associated with body dissatisfaction among 10-14 year olds (Rancourt and Prinstein, 2010). The self-satisfaction with one's weight is important in adolescence, since body perception issues may carry on into adulthood as mental health issues and social exclusion (Cromley et al., 2012; Eisenberg et al., 2008; Haines et al., 2013; Hansson and Rasmussen, 2014; Larson et al., 2007; Levin et al., 2012b; Neumark-Sztainer, 2002).

A distorted weight perception and weight related teasing might result in psychological issues and social exclusion in adolescents (Haines, 2013; Hansson and Rasmussen,

2014). For example, underweight or overweight adolescents stated higher levels of teasing than normal weight youth and both groups face stigmatization (O'Dea and Amy, 2011). Fear of being ridiculed causes harm in other areas of life (Ojala et al., 2012). Weight stigmatization may prohibit adolescent from taking part in other activities (such as sports) and in consequence weight and weight dissatisfaction increase further. Weight teasing has been also associated with disordered eating in the US (Neumark-Sztainer et al., 2002), therefore those tormented are in danger of other weight related disorders. Consequently, a normal weight perception may prevent from psychosocial problems and weight related disorders in adolescence.

4. FAMILY MEAL

4.1 Definition of family meal

In the previous studies the concept of a family meal may refer to any meal eaten at home, including breakfast, lunch, and dinner or evening snack. Most studies on family meals research studies asked the frequency of the meals. The previous studies have specified the benefits of family meals were only significant at a frequency of 5-6 times a week (Utter et al., 2013a). One parent is enough to construct a meal to a family meal (Musick and Meir, 2012). Other studies asked how many meals a week the family members dined together in an average week (Eisenberg et al., 2008; Fulkerson et al., 2009; Berge et al., 2013). Moreover, some research requested the number of times a week when adolescents' ate together with parents (Fulkerson et al., 2010; Levin et al., 2012b); whereas another study enquired the number of accompanied family meals, yet weekdays were not specified (Mikkilä et al., 2003).

In the current research the *evening or afternoon meal together with the family* is referred to as a family meal and used as a reference group. Furthermore, the question included answering options of *not a proper meal, helped him- or herself to food* and meal is prepared, yet not dined together. The adolescent may select an option that best describes the situation now, and therefore the *evening or afternoon meal* is not necessarily constantly the same. The weekdays are not specified. No distinction was made whether the meal was cooked or uncooked, and no meal components were measured. The specific number of the family members (e.g. siblings) around the dinner table is not known, and therefore the influence of associates is not acknowledged.

4.2 Family meals in numbers

The next chapter compare Finnish family meal frequency to the other countries. In Finland, fifty-five percent of the elementary school students missed the family meal together with the family (Luopa et al., 2014). The largest health indicator difference

amid the regions in Finland was the consumption of family meals (Luopa et al., 2014). The Helsinki metropolitan area had the most adolescents who missed accompanied family meal (Luopa et al., 2014). The disparity in the consumption of family meals is seen in Finnish high school students who ate the evening family meals together, ranging from 40% in the capital area to 62% in the Pohjanmaa-region (Luopa et al., 2014). The students in the capital area reported not having the shared family meals as often as the students in the isolated areas.

On the other hand, breakfast consumption does not differ much between regions. The daily consumption of breakfast (other than just coffee, juice or other drinks) during weekdays, regarding 8th and 9th graders, was 41% in Lapland, compared to 45% in Southern Finland (Luopa et al., 2014, pg.52). Under 30% of the elementary school students from the Southwest reported eating the free school lunch daily at school (Luopa et al., 2014). Adolescents' who skip the free lunch may be different to those who utilise it and 'the skippers' may consume excess food, such as snacks, beverages and take away meals. Therefore, supervised family meals are essential in order to balance the lunch absenteeism.

According to the Youth Statistics in New Zealand (Ministry of Youth Development, 2014), Finnish adolescents ate the least family meals (60%), compared to the average of the other 27 OECD countries (78.9%). In Italy, 93.6% of the students shared the family meals compared to 64.7% in New Zealand (Ministry of Youth Development, 2014). Another New Zealand study found that nearly 60% of the adolescent aged 13-17 (n=9107) shared a family meal with their families five or more times a week (Utter et al., 2013b). The current 2013 SHP study in Finland demonstrates the consumption of family meals among 8th and 9th graders. The frequency of the family meal consumption has increased from 2000 (39%) to 2013 (45%), considering the 8th and 9th graders (National Institute for Health and Welfare, 2014).

Furthermore, the inequality in adolescents' health needs to be addressed early enough in elementary school (Luopa et al., 2014), since the proportion of the children eating the family meal declines with age and decreased over time (Gillman et al., 2000). More than half of the 9-year olds ate family meals, whereas only one third of the 14-year olds did so (Gillman et al., 2000). Therefore, services that are able to address the specific

needs of adolescents who decline family meals are needed. Adolescents' may benefit from raising the awareness of valuable family meals (Gillman et al., 2000).

4. 3 Advantages and messages of family meals

The next chapter discuss family meal reimbursements. A meta-analysis concluded that shared family meal times offer nutritional benefits to all family members (Hammons and Fiese, 2011). Family dining has been approved to have benefits for adolescents (Fulkerson et al., 2006 and 2010; Mikkilä et al., 2003; Mure et al., 2014; Musher-Eizenman and Kiefner, 2013). Long-term benefits of the family meals are: enhanced vocabulary; academic success; healthy food selections; demonstration of positive values; and avoidance of high-risk behaviour (Fulkerson et. al., 2009). Adolescents who tend to eat routinely with the family spend more time on homework and leisure reading (Eisenberg et al., 2004). Therefore, less time is spent on detrimental activities and more effect is placed into the future in the form of education.

Family meals serve as a setting for the promotion of better nutrition habits (Hammons and Fiese, 2011). Gillman et al. (2000) demonstrate that the family meal is associated to beneficial eating patterns and a better quality diet, however the generalizability of the study was limited, since the subjects were mostly children of white registered nurses. However, other studies also found that nourishing dietary patterns are associated with the consumption of family meals (Neumark-Sztainer, 2003; Utter et al., 2013b) and family meal times are associated with the availability of healthier food items in some countries (Burgess-Champoux et.al., 2009; Gillman et al., 2000).

Therefore, family meals consumption also imply healthy food intake. Adolescents who frequently shared family meals reported that what they ate was healthy (Utter et al. 2013b). A statistically significant association between a higher consumption of vegetables and frequent family meals was found (Utter et al., 2013b). In another study, the frequency of family meals is also positively related to an increased intake of fruits; vegetables; grain; protein and calcium rich foods intake, and negatively associated only with the intake of soft drinks (Neumark-Sztainer, 2003). On the other hand, parental

obesity and access to unhealthy food may change the adolescents' food habits. Weight maintenance can be achieved during family meals if parents are health conscious.

Moreover, a longitudinal research discovered that unhealthy eating habits are likely to accumulate into adulthood (Neumark-Sztainer et al., 2006). Family meals ease the transition from early to middle adolescence (Burgess-Champoux et.al., 2009; Gillman et al., 2000). The advantage of family meals has not changed over time (Musher-Eizenman and Kiefner, 2013). However, another longitudinal research showed no continuous effects of family meals into adulthood on (Musick and Meier, 2012). On the contrary, the family meals appear to have potential to originate a life long healthy eating behaviour (Fulkerson et al., 2006).

On the other hand, the family meals may be offered, but they contain unhealthy ingredients (Utter et al., 2013b). Unhealthy food items offered during the family meals may subside advantages of the meal. However, the quality of the meal is irrelevant when reasoning the shared family meal availability. Previously, the knowledge of planning a family meal was transferred from generation to generation, yet now this transition of family meal knowledge doesn't always take place. Families are busier and meal times may be rushed or inattentive. The research recommends health professionals to encourage warm family meals three times a week at the minimum (Hammons and Fiese, 2011), whereas other research recommended more than that (Utter et al., 2013a).

Although family meal enhances healthy lifestyle this may not appeal for adolescents. Adolescents are likely to have more autonomy compared to younger children. However, better meal habits are needed for adolescents who eat family meals less frequent compared to younger children (Gillman et al., 2000). Moreover, rebellious (e.g. vandalism) adolescents are less likely to eat family meals (Goldfarb et al., 2014). Food choices may also reflect an image that adolescent adore and pursue. Essential food items may be left out or unhealthy food consumed in excess. The individual food and life-style choices are challenging and the peer group might have influence in adolescence.

4.4 Parent's role in feeding adolescents

The purpose of this chapter is to recognise parents' family meal responsibility. The provider of family meal must recognise healthy food and maintain an overall nutritional understanding. Prospective of time; money; availability; knowledge; flavour; tradition; advertising and food fashion all contribute to the food choices families make. Perplexed nutritional messages confuse consumers and health professionals. Parents may not understand all the food ingredients they purchase, due to the lack of nutritional understanding or as a result of ambiguous food marketing. It is challenging to distinguish between really healthy and unhealthy foods. Moreover, distorted food desires may cause nutrition related disorders in families. Families who deliver wrong messages during family meals foster negative eating habits.

Furthermore, the family meal reflects parenting priorities and offers ritual (Musick and Meier, 2012). Fostering healthy eating behaviours and warm meals instead of snacking can reduce the consumption of unhealthy food at home. Exceeding independence on the meal patterns may increase skipping meals and consuming junk food (Videon and Manning, 2003); therefore parental food restrictions are needed in adolescence. The consumption of fast food is associated with weight dissatisfaction in adolescents, especially in boys (Mikkilä et al., 2003).

The role of parenting methods in adolescent's family meal consumption is essential. While adolescents' need boundaries, the rigid child feeding practices influence the family meals that may become a stressful event (Berge et al., 2010). Therefore, *authoritarian* parenting, which can be measured as low warmth and strict discipline, may have negative influence on adolescent family meal frequency (Berge et al., 2010; Kremers et al., 2003), whereas *authoritative* parenting style is associated with frequent family meals (Berge et al. 2010). Longitudinal results revealed that an authoritative (respectful with high appeal) parenting style with a parent of the opposite gender predicted a higher frequency of family meals five years later (Berge et al., 2010). Therefore, clear boundaries and expectations alter the availability of family meals. Authoritative parent appeal for family meal presence, therefore have high

responsiveness. Parents can push adolescents toward family meal attendance; however unbending parenting may push them to the opposite (Berge et al., 2010).

In reality, family meals are not the only way of food parenting. However, adolescents (predominantly aged 13-17) who frequently shared family meals reported more parental monitoring and better communication among family members (Utter et al. 2013a). Moreover, a parent familiar with food parenting can be an asset for adolescent's health. The encouragement towards healthy food ingredients (Utter et al., 2013a) together with healthy food preparations techniques may enhance adolescent's eating behaviours for the future. On the other hand, no food restrictions at all may also cause overconsumption of unhealthy food items.

Disturbingly, a research from the US found that only 20% of the parents thought that meal rules and routine is a part of food parenting, whereas *none* of the older adolescents thought so (Musher-Eizenman and Kiefner, 2013). Half of the parents believed that providing healthy food is food parenting and only 23% said that the food restriction is a part of it (Musher-Eizenman and Kiefner, 2013). Nevertheless, clear boundaries and expectations used in an authoritative parenting style have been associated with higher frequency of family meals (Berge et al., 2010). Parents do not automatically understand the importance of family meals and food restrictions and therefore may provide unhealthy food items at home.

Parental food knowledge influences the adolescents' food intake at home. A research proposed that if parental behaviour is changed the children correspond to it (Kremers et al., 2003). The adolescents choose food items that taste good and are not necessarily aware of the importance of healthy food. Therefore, it is pertinent to consider that parents need to be educated on the benefits of family meals. Further reinforcement of nutrition guidelines may improve adolescents' diets. The challenge is to avoid unhealthy food items.

Parents dominate the food choices whether the healthy food customs exist or not. Research indicates that children would like to influence family dining, which means that they want to participate and be involved in tranquil family meal times (Ministry of Social Affairs and Health, 2007). Adolescents' family meal conditions could improve

through increasing their involvement in planning the family meals.

4.5 Family functioning

Extending beyond the current study question, it is also pertinent to consider that UNICEF's (2007) research found Finnish adolescents' family and peers relationships poor. Therefore, a need for improvement in family relationships is feasible. Preventive practices, such as parent's firm presence could narrow the broadening health gap in Finland (Ministry of Social Affairs and Health, 2007). Musick and Meier (2012) distinguished that the routine of consistent family meal times can create feelings of closeness and comfort in a family.

Realistically, not all families can offer a positive atmosphere while dining, and quality of meal times can be poor. However, family meals represent support within a family (Berge et al., 2013; Larson et al., 2007). Families operate as social systems (Musick and Meier, 2012) and it is naive to reason that only the family meal influences children's wellbeing. A recent longitudinal research examined a set of different aspects (adult depressive symptoms, substance use and delinquency) to see family functioning. Moreover, family priorities and beliefs can be seen in family practices, routines and rituals (Musick and Meier, 2012). Eating family meal together offers comfort and regularity for adolescent, which instead may protect adolescents from depression and risky behaviour (Musick and Meier, 2012).

Healthy family meal times instead of hurry may maintain parenting and comfort adolescents. Routines and rituals that family meal offers improve the sense of safety (Berge et al., 2010) and the quality of a parent-child relationship may develop during the family meal due to increased supervision. As the adolescent develops, the family meal is perceived less important, and therefore the family meals may loose their significance as a potential health enhancer (Fulkerson et al., 2006). Nevertheless, parental awareness of the adolescent's peers, neighbourhood environment and leisure activities can still be controlled during the family meals (Utter et al. 2013a).

Firstly, family functioning implies to the organisational properties and interpersonal interactions of the family (Berge et al., 2013). Family functioning can be measured from several factors such as: problem solving, communication, roles, affective responsiveness, affective involvement, and behaviour control among the family members (Berge et al., 2013). Secondly, research expresses family connectedness (fun together, getting along with family members, closeness to parents, time parents use for warmth and loving) that was represented separately from family monitoring and communication with parents (Utter et al. 2013a).

A higher family functioning was associated to more frequent family meals in adolescents (Berge et al., 2013). Looking at girls, family functioning was related to a lower BMI, less sedentary behaviour and higher intake of fruits and vegetables. Regarding boys, higher family functioning was related to more PA, less sedentary behaviour and less fast-food consumption. Therefore, the implementation of the family meal is important for adolescent health.

4.6 Determinants of family meal

4.61 Sociodemographic variables

Protecting family meals prevent SES related health inequalities and reduce the likelihood of risk behaviour in adolescence (Levin et al., 2012b, Mure et al., 2014). Family support is important in preventing health disparities (Luopa et al., 2014). Therefore, supportive family meals may need to be reinforced in adolescence.

Families with two parents had more family meals (Levin et al., 2012b). However, the family structure was not the significant variable related to adolescent hazardous eating habits and any type of family could offer healthy meal times. The impact of health debilitating SES variables was moderated if family meal was offered in low-income family of any type of family structure. Although research exposed that the family structure (one parent family) was associated with substance abuse; the family meal reversed the association. Therefore, serving family meals reduced the risk of substance abuse, no matter what the family arrangements are (Levin et al., 2012b). Accordingly,

regardless of family's structure, it is capable of contributing to a safe family meal environment.

Another research evaluated the SES level by measuring education, employment and poverty (Berge et al. 2010). The main variable to assess a high SES was parents' the high educational level of the parents. Those who received public assistance or free lunch in the US were in a low SES category. Moreover, gender disparities exist, since boys seem to have family meals more frequently than girls (Berge et al., 2013). In Finland, 45.3% of the boys (n=29 718) had family meals compared to 38.6% of the girls (n=30534) (Mikkilä et al. 2003).

Unemployment is a health-debilitating factor (Luopa et al., 2014). Adolescent's health may weaken due to unemployment. Family meal problems can be predicted via measuring the SES, such as unemployment and temporary lay-offs. Unquestionably, some parents offer family meals no matter what their SES context is. According to the SHP study, a good relationship with parent's safeguards adolescents from problems, although unemployment and parent's poor education exists (Luopa et al., 2014). Nevertheless, unemployment may have a significant effect on the family meals. This may be due to affordability of healthy food or health problems related to unemployment.

In 2013, approximately a quarter of the Finnish elementary school students reported having at least one unemployed parent (Luopa et al., 2014). There was a significant variability in the parent's unemployment rates in different regions (21%-36%). In regions with high unemployment, the adolescents perceived their health more often average or poor. In the whole country, twenty-nine percent of the elementary school students reported that at least one of the parents has been unemployed or laid-off during the past year (Luopa et al., 2014). This may have an impact on the family meals.

Similarly, the Health Behaviour in School-Aged Children (HBSC)-study with the Family Affluence Scale (FAS) demonstrates that inequalities in the SES and economic circumstances influence adolescents' health (Currie et al., 2008). Inequalities in the SES can be seen in self-reported health, psychosomatic symptoms, PA level and eating habits (Currie et al., 2008). However, although the family affluence has significance for

adolescents' behaviour; also the families with a low SES have potential to offer an environment for nurturing family meals.

According to research, family meals can represent family support (Berge et al., 2013: Larson et al., 2007). However, family meals may have changed during time. The entire society is more mobile now, people commute and families may not be as imperative as before. Influential family peers, such as grandparents, may live far and these variations in family support may also have altered the family meals. Families that migrate in order to achieve better life standards may find themselves in poorer conditions without relatives or other peer support.

4.62 Lifestyle variables

Adolescents' living conditions had improved and parenting has augmented from 2000 to 2013 (Luopa et al., 2014). Parents knew more often where the adolescents spend their free time and less interaction difficulties were experienced. Moreover, parents' lifestyle had improved and they smoked less than previously.

However, the parents may profoundly engage with working environments, and therefore be unavailable at home during the meal times. Some parents work occasionally, or do shift work that deprives family mealtime and due to that the family meal habits may become irregular. Family's engagement in demanding hobbies and other schedules can prompt meals due to deprived time management.

Overall, boys reported more frequent family meals and a higher physical activity level (Berge et al., 2013). Exercising boys follow healthier food regimes (Berge et al., 2013) possibly due to increased energy expenditure and need for fuel while aiming at successful sport results. Active adolescent boys may request family meals, or parents provide family meals for exercising adolescents. Girls had less sedentary behaviour in well functioning families (Berge et al., 2013). Correspondingly, previous research discussed the fact that an increase in sedentary behaviours and changes in eating patterns may also contribute to increasing rates of overweightness and obesity (Kautiainen, 2008).

Nevertheless, physically active adolescents are less likely to take part in detrimental activities, such as substance abuse (Mure et al., 2014). Several studies have found an association between lower frequency of family meals and the substance abuse (Eisenberg et al., 2004 and 2008; Fulkerson et al., 2006 and 2010; Levin et al., 2012b). Those adolescents that reported shared family meals had less self-destructing behaviour, such as the use of intoxicants (smoking, snuff, monthly/weekly alcohol use and illegal drugs) in both genders (Mure et al., 2014). Another research found a significant association between the substance use and lower frequency of family meals in boys (Eisenberg et al., 2004). What emerged was that a protecting factor of family meals for adolescents is based on increasing opportunities to discuss daily activities and hazards, such as intoxicants use (Eisenberg et al., 2008; Fulkerson et al., 2010; Levin et al., 2012b).

A shared family meal is probably the only occasion throughout the day that parents spend together with the adolescents. Fundamentally, adolescents' achievements or obstacles of the day need to be discussed with an adult. The contact during family meals protects adolescents from becoming victims of substance abuse (Elgar et al., 2014). Therefore, family meal protects adolescents from vulnerability. Family meal also offers comfort and regularity that safeguard from risky behaviour (Musick and Meier, 2012).

Furthermore, the high BMI (that has secondary relation to lifestyle) is related to having no family meals (Mikkilä et al., 2003). Another research has exposed that the relation of family meals relation to adolescents BMI was not statistically significant in New Zealand (Utter et al., 2013b); whereas research in Finland indicates that girls who did not have evening meals at home were more likely to be obese (Mikkilä et al., 2003). Therefore, the family meal has weight related health benefits and the family meal consumption is also associated to a normal weight perception (Mikkilä et al., 2003).

4.63 Communication satisfaction with parents

The communication satisfaction with parents, which is used as one variable in the current research, is a part of family functioning. The study findings propose that the parent-child communication can be improved by making family dinner a priority (Fulkerson et al., 2010) and the meals seem to better the quality of the communication.

However, communication can be either positive or negative around the dining table. There are families with multiple problems; and the family meals may have a negative impact on adolescents, if the interfamilial communication is poor. Although most of the children in Finland feel well, a group of adolescents had intensifying problems (Ministry of Social Affairs and Health, 2007).

Nevertheless, adolescents' difficulties in a discussing with parents were reduced over time in Finland (Luopa et al., 2014). In 2013, 10% of the elementary school girls and 7% of the elementary school boys reported discussion difficulties with the parents. The proportion of the discussion difficulties was reduced 4-6% from the year 2000/2001 for both genders.

Moreover, an easy communication with parents was approved as a protective factor for the girls (Levin et al., 2012a). The quality of the parent-child communication contributes to frequent family meals (Berge et al., 2010). Adolescent feel loved and cared during the meals, which ensures good communication. Time spent together as a family endorse family interaction. Family functioning incorporates decent communication, problems solving, closeness and behaviour control (Berge et al., 2013). However, family communication these days is carried out using mobile equipment and therefore communication may be interrupted.

The communication within social media was not a circumstance ten years ago and it adds to the demanding schedules. Therefore, families have less time for the preparation of food and each other in these days. Family meal times may suffer from constant messaging and family's engagement with the technological equipment, thus less time is spent together as a family. There have been major changes in the development of technology, which may have resulted in behavioural changes and social stress within the families.

Furthermore, through the family meals adolescents can be protected against cyberbullying in social media (Elgar et al., 2014). Companionship offered during the family meal times is noteworthy; since it establishes a space for communication and optimistically models appropriate food behaviour. Higher consumption of family meals and a better interaction with the social environment were associated; and therefore the

family meal enhances adolescents' psychosocial health (Eisenberg et al., 2004 and 2008; Fulkerson et al., 2006). Correspondingly, a low life-satisfaction was connected to parent-child communication in adolescence within the age group 11-15 years (n=5126) (Levin et al., 2012a).

Parents influence the adolescent's eating habits through comments and nonverbal communication (Musher-Eizenman and Kiefner, 2013), although the effect depends on the tone of the communication. It is pertinent to consider that adolescents see parental support in the communication that they experience with parents during the family meal times. The family meal offers a possibility for the parents to influence adolescents' development, as well as their behaviour (Compan et al., 2002; Fulkerson et al., 2010; Mure et al., 2014). A supportive family meal has been shown to have communication enhancing potential.

5. FAMILY MEAL, COMMUNICATION SATISFACTION AND WEIGHT PERCEPTION ASSOCIATION

In the following chapter the proposal of this study is rationalised. The idea of the current study originated from Mikkilä's et al. (2003) research. Mikkilä et al. (2003) found an association between higher family meal consumption and the normal weight perception. In both genders, the association remained significant after other variables were added to the model. The SES variables were strongly associated with weight dissatisfaction. The most significant variables were overweightness, parents' education, the economic situation of the family and school success. Particularly for the boys, a low economic situation of the family was associated with weight dissatisfaction, whereas the PA level had a protective effect. Therefore, a low SES status affects the consumption of family meals, as well as increases weight dissatisfaction. Adolescents who perceived themselves normal weight consumed more family meals than the ones dissatisfied with their weight (Mikkilä et al., 2003).

Similarly, the SES, parents' employment status and education level was used when studying family meals (Neumark-Sztainer et al. 2003). However, some research found that a low SES affects especially the girls' weight perception and family meal status (Currie et al., 2008), whereas Mikkilä (2003) found that the economic situation of the family affected the boys more. Analogously other food consumption, the BMI and the PA level were considered in the family meal studies (Berge, et al., 2013; Mikkilä et al., 2003) and therefore taken into this research design. Gender differences exist in health issues; girls present more symptoms in general (Cromley et al., 2012; Kaltiala-Heino et al., 2003, Mikkilä et al., 2003; Ojala et al., 2012). Consequently, the gender alterations must be taken into consideration.

Moreover, 60% of high school students in the capital area had not proper family meals, but everyone in a family grabbed something to eat (Luopa et al., 2014). What emerged was that the lack of family meals might affect the adolescents weight perception in Finland (Mikkilä et al. 2003). Overall, a shared family meal enables adolescents to enhance their communication skills, learn manners and good eating habits (Eisenberg et al., 2004). A safe and supportive home environment provides transferable skills for

adolescent to take care of him- or herself later on in life (Burgess-Champoux et.al., 2009; Fulkerson et al., 2006).

On the other hand, an unorganised family meal may be a stressful event that contributes to tapering family communication. However, a family meal may still increase the feeling of being valued. Research findings suggest that family meals and family functioning are related to weight-related health behaviour and self-esteem (Berge et al., 2013; Larson et al., 2007). Therefore, the family meal and communication with parents both may influence the weight perception. The family structure may influence the communication and life satisfaction among adolescents in favour for nuclear families (Levin et al., 2012a). Families, which are committed to preparing meals together and have set times for dining, may have better communication and high responsiveness.

In addition to the nutritional value of a family meal, research suggests that a family meal can measure family connectedness (Eisenberg et al., 2004) and family functioning (Berge et al., 2013), which are related to open communication. Furthermore, perceived parental support for healthy eating was suggested to increase normal weight in adolescents (Utter et al., 2013b), therefore interactive parenting may further relate to weight perception. A longitudinal investigation found also that family meals build a positive connection amid adolescents and parents (Musick and Meier, 2012).

Subsequently, food choices are linked to adolescents weight perception and family meals improve self-esteem (Fulkerson et al., 2009; Offer, 2013). Therefore, results support the current research hypothesis an association between the high family meal consumption, communication satisfaction with parents and normal weight perception. Parents have significant influence on the adolescents' weight perception, body image and eating (Al Sabbah et al., 2009). Parents can comment, suggest and elude food habits. A parent acts as a role model and ideally prevents weight-related problems with healthy family meal. The emphasis on healthy food, communication and boundaries during the family meal may prevent distorted weight perception. Therefore, the family meals may function as a promoter for habits to prevent incorrect weight perception.

The proposed association of family meals and adolescent weight perception was found (Mikkilä et al., 2003). Furthermore, weight dissatisfaction was associated with

difficulties in talking to parents (Al Sabbah et al., 2009). Therefore, communication satisfaction with parents was associated to better weight perception; yet no other research was found on the association between the family meal, communication satisfaction with parents and weight perception association. However, since the findings suggest that enhanced communication with the parents contribute to body satisfaction (Al Sabbah et al., 2009); all these three: family meals consumption, communication satisfaction with parents and weight perception may associate. Therefore, the current research examines these variables.

6. AIMS AND RESEARCH QUESTIONS

The aim of this research is to study the association between the consumption of evening family meals and the weight perception of 14- to 16-year-old Finnish adolescents, separately for boys and girls. A purpose of this research is to find whether shared family meals and normal weight perception are associated among adolescents.

One proposal is that increased exposure to communication with parents may enhance the perception of weight satisfaction in adolescents. Therefore, the study also aims to distinguish whether there is an association between evening family meals, communication satisfaction with parents and weight perception.

The research questions are:

- Is the afternoon or evening family meal consumption associated with weight perception among 14-16 year old adolescents in Finland?

- Does communication satisfaction explain the probable association observed among family meal and weight perception?

7. MATERIALS AND METHODS

7.1 School Health Promotion study

The subjects consisted of 8th and 9th graders from comprehensive schools in Finland, who participated in the cross-sectional School Health Promotion (SHP) study. The population of 99 478 pupils participated in the 2013 SHP study (Terveyden ja Hyvinvoinnin Laitos, 2015). The total response rate for comprehensive schools was 84% (Terveyden ja Hyvinvoinnin Laitos, 2015). The 1st and 2nd graders from the upper secondary school and 1st and 2nd graders from vocational school were included in the original study. Also pupils from special education schools participated in the study if they were able to fill it independently. The focus of the questionnaire is on living and school conditions; health and health-related behaviour and school health services (National Institute of Health and Welfare, 2014). The SHP-questionnaire has been evaluated in the National Institute of Health and Welfare research ethics committee in the 2012 (National Institute of Health and Welfare, 2014). The survey includes a consent form; it is properly supervised and anonymous. The study consent from the participants is not needed for the secondary data analysis. The questionnaire is voluntary, and the subjects can fill in the questionnaire in the classroom. The questionnaire was not completed in the English language, however the translated version presents the questions in English. The SHP questionnaire is available from: http://www.thl.fi/attachments/kouluterveyskysely/SHP_questionnaire_2013.pdf

Of the total sample of the 8th and 9th graders who participated in the survey, 6488 were excluded in the current study, since they were younger than the 14.33 or older than 16.25 years. After the age restriction the final number of the 8th and 9th graders was 92 990. Out of these respondents, 50.9% were 8th graders and 49.1% were 9th graders. The total of 50.1% (n=46 579) of the study subjects were boys and 49.9% (n=46 411) girls. The initial analysis included basic frequencies and percentage distributions. All the basic frequencies are described separately for boys and girls. A total of 71 288 cases were included in the final multivariate logistic regression analysis for all the variables for Model 3.

7.2 Variables used in the present study

The main outcome variable in this study was the weight perception. The question asked was: 'What do you think about your weight?' When asking about the weight perception the answering options were: 'Do you consider yourself (1) clearly overweight, (2) slightly overweight; (3) having a health weight; and (4) clearly or slightly underweight. The categories were named as: 1) Perceived weight normal, 2) Perceived clearly overweight, 3) Perceived sightly overweight, 4) Perceived slightly or clearly underweight.

The main exposure variable in this study was the consumption of family meals. The adolescents were asked whether they ate meals together with their family in the afternoon and in the evening. The question was: 'Which of the following alternatives best describes your family's eating habits in the afternoon or evening?' When asking about the consumption of family meals the answering options were: 1) We do not have a proper meal, everyone grabs something to eat, 2) We have a proper meal, but we do not eat all at the same time, 3) We enjoy meal together and usually everybody is at the table. The categories were named as: 1) No meal, everyone helped themselves, 2) Meal prepared, not dined together, 3) Family meal dined together.

The explanatory background variables, excluding the grade the pupils was attending, were further classified as socioeconomic and lifestyle variables. The SES variables included the following variables: family structure; parent's education; parent's employment; and study success of the subject (grade point average). The following background variables were considered as lifestyle: the BMI; physical activity; alcohol use; smoking; school lunch; breakfast and communication satisfaction with parents. All the background variables were categorical. A detailed description of all the explanatory variables is given below. The additional categorisation is explained under the variables where a further categorisation was used. Otherwise the variables were used as they stand in the SHP-questionnaire.

Respondents were asked to report whether they were in grade 8 or 9 in the upper comprehensive school. The SES of the family is assessed with the following four

questions: Firstly, the structure of the family was asked with the following question: 'Who are the adults you live with?' The answering options were: 1) My mother and my father, 2) My mother and my father alternately, my parents don't live together, 3) Only my mother, 4) Only my father, 5) Father/mother and his/her partner, 6) One or more other adults, 7) None of the above. The last two answers were combined due to small number of observations. Since 'the single parent family' answers may differ according to whether the adolescent lives with his or her mother or father, they were kept separately.

Secondly, the educational level of the parents was asked: 'What is the highest educational level that your parents have achieved?' The answering options were given separately for the mother and the father: 1) Comprehensive school or primary school, 2) Upper secondary school or vocational education institution, 3) Occupational studies in addition to upper secondary school or vocational education institution, 4) University, university of applied sciences, or other higher education institution, 5) No education. The following categories were formed: 1) Neither has a university degree or other higher level of education, (2) Only the father has a university degree or other higher level of education, (3) Only the mother has a university degree or other higher level of education, (4) Both have a university degree or other higher level of education.

Thirdly, unemployment of the parents was asked 'During the past YEAR have your parents been unemployed or laid off?' The answering options were: 1) Neither of my parents, 2) One of my parents, 3) Both parents.

Fourthly, the school performance of the subjects was used. In Finland, the high school report cards mean that the average is taken from the scale of four to ten. The latest grade point average (GPA) of the latest school report was asked: 'What is your average grade (all subjects) on your latest school report?' GPA answers were categorised as follows: 1) <6.9, 2) 7.0-7.9, 3) 8.0-8.9, 4) 9.0-10.

The life style variables were queried with the following six questions. Physical activity was queried: 'During your SPARE TIME, how often do you engage in sports or other physical exercise for at least A HALF AN HOUR?' The answers were categorised as

follows: 1) Once or more than once a day, 2) 4-6 times a week, 3) 1-3 times a week, and 4) Less than once a week or never.

The BMI was queried: 'Height and weight (please mark clearly in numbers)' The BMI was used to define body weight status and it is perceived in the tables as a lifestyle variable. The subjects were asked to report their weight in kilograms and their height in centimetres. The BMI was calculated by dividing weight (kg) by height (m2). International Obesity Task Force (IOTF) cut-offs were used to categorise the BMI into normal weight (18.5-25), underweight and overweight or obese (Cole and Lobstein 2012). The age restriction (14.25-16.33) of the current study was used to get the correct BMI values for this age group.

The alcohol consumption of the pupils in the survey was queried: 'How often do you use alcohol to get HEAVILY DRUNK?' The answering options were: 1) Once a week or more often, 2) About 1 to 2 times a months, 3) Not very often, 4) Never.

Asking two questions that were combined in this study assessed the smoking habits. First the subjects were asked whether they smoked or not. If adolescent smoked, they were asked to report the frequency of smoking. The answering options were: 1) I smoke once a day or more often, 2) I smoke once or week or more often, but not every day, 3) I smoke less often than once a week, 4) I have quit smoking (temporarily or permanently), 5) None. The smoking categories were named as: 1) Daily, 2) Once a week or more frequently, 3) Less than once a week, 4) Quit or abstained from smoking, 5) Not smoking.

The consumption of school lunch was queried: 'How often do you eat a school-lunch during the school-week?' The answering options were: 1) On five days, 2) On 3-4 days, 3) On 1-2 days, 4) Less frequently. The lunch categories were named as: 1) 5 days a week, 2) 3-4 days a week, 3) 1-2 days a week, 4) Less frequently.

The consumption of breakfast was queried: 'How often do you eat breakfast (other than just coffee, juice or other drinks) during the school week?' The answering options were: 1) On 5 mornings, 2) On 3 to 4 mornings, 3) On 1 to 2 mornings, 4) Less frequently.

The breakfast categories were named as: 1) 5 mornings a week, 2) 3-4 mornings a week, 3) 1-2 mornings a week, 4) Less frequently.

The communication satisfaction with the parents was queried: 'Can you talk about things that concern you with your parents?" The four answering options were: 1) Hardly ever, 2) Every once and a while, 3) Fairly often, 4) Often. The categories were named as: (1) Hardly ever, (2) Every so often, (3) Quite often, and (4) Often.

7.3 Data Analyses

All the variables were categorical, and therefore crosstabulation analysis was used for measures of association. The analyses were made separately for boys and girls. Pearson's chi square tests were used to determine the significance levels. The results were considered statistically significant if the p-value was less than 0.05. The p-values are not shown, since they all showed significant levels.

The weight perception is evaluated with other variables: the main exposure variable is family meal. The background variables are the SES background and lifestyle variables, and finally with the communication satisfaction with parents. The association between the family meals and the socioeconomic background variables and the lifestyle variables were all statistically significant.

The weight perception variable was used as a dichotomous dependent variable in the logistic regression: 0) normal weight and 1) perceived under- or overweight. Subjects who perceived normal weight (having a health weigh) were used as a comparison group to all other three categories that were combined into one. The logistic regression was used to study the associations further and to explain weight perception by the variables family meal and communication satisfaction with the parents. In the first, second and third logistic regression model seen below, the comparison group was the group of subjects who perceived their weight normal.

In the first *univariate model 1*, logistic regression analyses between the weight perception and the main exposure variable (family meals) as well as each SES and lifestyle variable were produced separately. The second *multivariate model 2*, excluded the communication satisfaction with parents from the analysis. All other explanatory SES and lifestyle variables, and main exposure variable family meal were used in the logistic regression analysis as independent variables and the weight perception as a dependant variable in the logistic regression analysis. The third *multivariate model 3* included the communication satisfaction with parents, in addition to all the other SES and lifestyle variables and the family meal (as in above model 2). The purpose of this was to answer the second study question: 'Does communication satisfaction explain the probable association observed among family meal and weight perception?'

All the analyses were completed separately for boys and girls. The strength of the association was measured with OR (odd ratio) and 95% CI (confidence interval). The analysis was made with IBM SPSS Statistics 22.0-software.

8. RESULTS

8.1 Descriptive data

Out of all the girls, 55.8% perceived their weight normal, compared to 68.2% of the boys (Table 1). The biggest gender differences were in perceived slight overweightness, girls considering themselves overweight more often (girls 30.4%, boys 15.6%). Girls perceived underweight less frequently.

Less than half of the adolescents reported having family meals together with the family (Table 1). The family meals together with the family were more common among boys than the girls. Often the meal was prepared, although not eaten together with the other family members. Girls reported more often having no meal prepared at home.

More than half of the adolescents reported communicating with their parents regularly (quite often or often). Nevertheless, almost 45% of the adolescents reported communicating every so often or never with their parents (Table 1).

No major gender differences existed in the categorised BMI. Girls reported underweight more frequently compared to boys. In comparison, overweightness and obesity were more common among boys. The physical activity levels were similar in both genders, whereas the frequent use of alcohol and smoking were more common for boys. However, most of the adolescents had never tried alcohol or smoked. Although most of the adolescents had school lunch and breakfast five days a week, a noteworthy amount of the study subjects had lunch only 3-4 times a week and breakfast was skipped regularly.

Table 1. The adolescents' weight perception, family meals consumption, communication satisfaction with parents and variables describing lifestyle presented in frequencies. School Health Promotion study 2013 (girls n=46 411, boys 46 579).

	Girls		Boys	
	n	%	n	%
Weight perception				
Perceived weight normal	25 550	55.8	31 081	68.2
Perceived clearly overweight	3 309	7.2	1 910	4.2
Perceived slightly overweight	13 931	30.4	7 110	15.6
Perceived slightly or clearly underweight	2 989	6.5	5 440	11.9
Missing values	632		1 038	
Family meal				
No meal, everyone help themselves	5 186	11.3	4 306	9.4
Meal prepared, not dined together	21 426	46.5	19 468	42.6
Family meal dined together	19 440	42.2	21 949	48
Missing values	359		856	
Communication satisfaction				
Hardly ever	4 293	9.3	2 986	6.6
Every so often	16 116	35.1	14 241	31.3
Quite often	14 147	30.8	15 760	34.6
Often	11 376	24.8	12 562	27.6
Missing values	479		1 030	
BMI[a]				
Normal weight	32 536	76.3	31 115	73.7
Underweight	4 433	10.4	1 942	4.6
Overweight or obese	5 649	13.3	9 170	21.7
Missing values	3 793		4 352	
Physical activity				
Once or more than once a day	14 824	32.2	17 217	37.8
4-6 times a week	12 832	27.9	11 531	25.3
1-3 times a week	15 425	33.5	12 746	28.0
Less than once a week or never	2 947	6.4	4 017	8.8
Missing values	383		1 068	
Alchohol use				
Once a week or more often	627	1.4	1 257	2.7
About 1-2 times a month	4 442	9.6	4 286	9.3
Not very often	11 129	24.1	11 169	24.3
Never	29 887	64.9	29 228	63.6
Missing values	326		639	

Table 1. (continued)

Smoking				
Daily	5 056	11.0	6 369	13.9
Once a week or more frequently	1 923	4.2	1 933	4.2
Less than once a week	3 935	8.6	3 113	6.8
Quit or abstained	5 646	12.3	6 964	15.2
Not smoking	29 387	64.0	27 294	59.8
Missing values	464		906	
School lunch				
5 days a week	29 906	64.9	31 170	68.2
3-4 days	10 320	22.4	9 548	20.9
1-2 days	3 131	6.8	2 705	5.9
Less frequently	2 712	5.9	2 304	5
Missing values	342		852	
Breakfast				
5 days a week	25 421	55.1	27 713	60.4
3-4 days	7 829	17.0	6 994	15.2
1-2 days	5 223	11.3	4 413	9.6
Less frequently	7 657	16.6	6 778	14.8
Missing values	281		681	

a Criteria for overweight and obesity: IOTF (Cole and Lobstein, 2012). The criteria for overweight include obesity.

The majority of the participants lived with both parents (Table 2). Over half of the adolescents reported that neither of the parents was highly educated (a university degree or other higher level of education). Either one or both of the parents were unemployed in almost 30% of the families and there was only a slight difference in between girls and boys. Less than 10% of the girls had a grade point average (GPA) under 6.9, compared to almost 20% of the boys. In comparison, these figures were vice versa in the 9.0-10 GPA-group.

Table 2. The adolescents' grade and background variables describing the socioeconomic position presented in frequencies. School Health Promotion study 2013 (girls n=46 411, boys 46 579).

	Girls		Boys	
	n	%	n	%
Grade				
8th	23 327	49.3	24 003	50.7
9th	23 084	50.6	22 576	49.4
Family structure				
Both mother and father	30 820	67.7	31 201	69.4
Monther and father in turns	4 364	9.6	5 197	11.6
Just mother	4 858	10.7	3 898	8.7
Just father	728	1.6	976	2.2
Mother/father and partner	3 852	8.5	2 751	6.1
Another family form	880	1.9	904	2.0
Missing values	909		1 652	
Parents education				
Neither high	22 220	54.2	20 897	52.5
Father high	3 378	8.2	3 669	9.2
Mother high	5 840	14.2	5 552	13.9
Both high	9 554	23.3	9 704	24.4
Missing values	5 419		6 757	
Unemployment or redundancy				
Neither parent	32 434	70.7	32 947	70.7
Other parent	12 066	26.3	11 097	26.3
Both parents	1 373	3.0	1 399	3.0
Missing values	538		1 136	
Grade point average				
<6.9	4 145	8.9	9 087	8.9
7.0-7.9	13 020	28.1	18 370	28.1
8.0-8.9	19 290	36.6	14 751	36.6
9.0-10	9 578	20.6	3 864	20.6
Missing values	0		0	

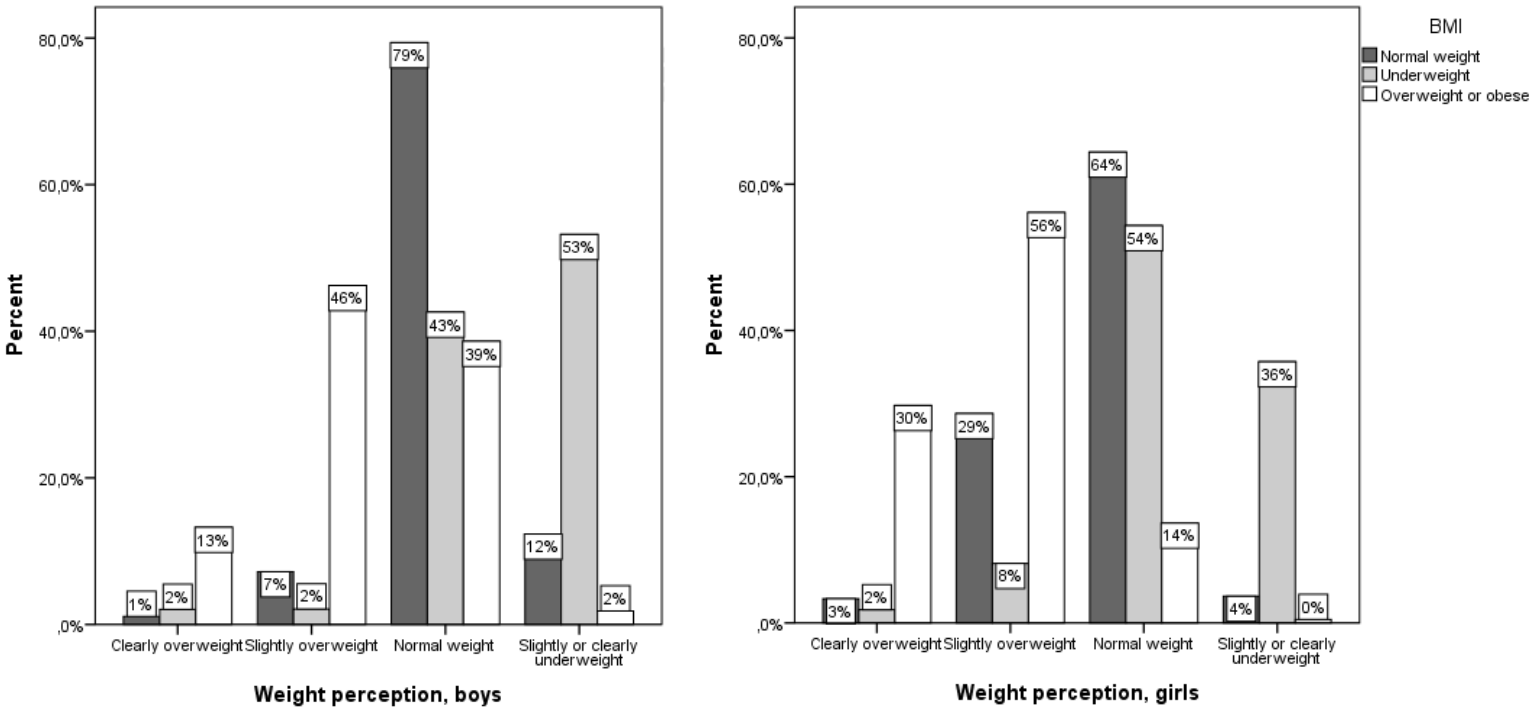
8.2 The influence of the family meal and background variables to weight perception

All the univariate associations with the low family meal consumption, not communicating with parents and the under- or overweight were statistically significantly associated to the perception of under- or overweightness. The other variables describing lifestyle and SES were also statistically significantly associated to the perception of under- or overweightness.

Those who reported a less frequent consumption of family meal perceived their weight under- or overweight (Table 3). For both boys and girls, a more frequent communication satisfaction with the parents was associated with a less frequent perception of under- or overweight (Table 3.).

There were also major gender differences in the accuracy of weight perception (Figure 1.). Almost 40% of the boys, who were overweight or obese perceived normal weight, whereas 14% of the girls who were overweight or obese perceived normal weight. Boys perceived their weight more normal than girls in normal and overweight groups, however they perceived their weight less normal in the underweight group.

Figure 1. The weight perception accuracy in adolescent boys and girls. School Health Promotion study 2013 (girls n=46 411, boys 46 579).



In the BMI categories, the overweight adolescents perceived least normal weight. A higher physical activity level was associated with less perceived under- or overweightness in both genders. Compared to girls, boys reported less perceived under - or overweightness in all the categories.

Those who smoked or used alcohol more frequently perceived underweight or overweight more frequently (Table 3). Consuming school lunch and breakfast less frequently than daily was associated to perceived under- or overweightness, especially for the girls.

Table 3. The proportion (%) of adolescents' perceiving themselves as under- or overweight in the categories family meal, lifestyle and communication satisfaction with parents. School Health Promotion study 2013 (girls n=46 411, boys 46 579).

	Girls	Boys
	Perceived under- or overweight, %	Perceived under- or overweight, %
Family meal		
No meal, everyone help themselves	53.3	41.1
Meal prepared, not dined together	45.0	31.7
Family meal dined together	40.8	29.8
Physical activity		
Once or more than once a day	41.5	25.3
4-6 times a week	41.4	29.2
1-3 times a week	47.2	37.6
Less than once a week or never	53.1	47.5
BMI[a]		
Normal weight	35.6	20.6
Underweight	45.7	57.4
Overweight or obese	86.3	61.4
Alchohol use		
Once a week or more often	63.1	54.1
About 1-2 times a month	52.0	32.7
Not very often	49.4	30.2
Never	40.7	31.3
Smoking		
Daily	56.2	36.8
Once a week or more frequently	54.3	35.6
Less than once a week	50.7	32.1
Quit or abstained	50.3	32.2
Not smoking	39.5	30.3
School lunch		
5 days a week	39.9	29.4
3-4 days	48.7	34.4
1-2 days	54.4	38.0
Less frequently	62.7	43.4

Table 3. (continued)

Breakfast		
5 days a week	37.6	28.4
3-4 days	47.4	33.9
1-2 days	51.4	36.1
Less frequently	57.6	40.2
Communication satisfaction		
Hardly ever	62.6	47.9
Every so often	49.5	33.8
Quite often	40.5	29.9
Often	34.3	27.8

a Criteria for overweight and obesity: IOTF (Cole and Lobstein, 2012). The criteria for overweight include obesity.

Looking at the socioeconomic variables (Table 4.), the least perceived under- and overweightness was observed in the adolescents who lived with both parents (Table 4). For the girls, perceived under- or overweightness was highly associated with living with one parent and living with parent who lived with a partner (other than the parent). Living in another family form, other than the family form categories mentioned, was associated to perceived under- and overweightness in both genders.

A low educational level of the parents was associated with the perceived under- and overweightness for both genders (Table 4.). The difference was that girls living with a highly educated mother reported more perceived under- and overweightness than girls living with a highly educated father. For the boys, the figures are the opposite. However, differences in the percentages within the gender are minor. Unemployment or redundancy of the parents seems to affect boys more than the girls observing the perceived under- and overweightness. Having a low grade point average was associated to the girls perceived under- and overweightness more than the boys. In both genders, an adolescent who succeeded at school perceived less under- and overweightness.

Table 4. The proportion (%) of the adolescents' perceiving themselves as under- or overweight in different socioeconomic categories. School Health Promotion study 2013 (girls n=46 411, boys 46 579).

	Girls	Boys
	Perceived under- or overweight, %	Perceived under- or overweight, %
Family structure		
Both mother and father	41.8	29.6
Mother and father in turns	45.9	33.7
Just mother	49.2	36.5
Just father	47.8	37.0
Mother/father and partner	50.6	35.9
Another family form	55.1	48.9
Parents education		
Neither high	46.7	32.6
Father high	42.4	32.5
Mother high	44.2	31.1
Both high	37.5	27.7
Unemployment or redundancy		
Neither parent	45.0	30.1
Other parent	43.4	34.9
Both parents	44.2	44.8
Grade point average		
<6.9	57.3	36.3
7.0-7.9	50.8	32.6
8.0-8.9	42.2	29.2
9.0-10	33.6	27.2

A high physical activity level (Table 5.) was associated with eating family meals together with the family for the boys. However, the girls who exercised 4-6 times a week had the most family meals compared to those who exercised more. Those who exercised less than once a week or less had the least family meals in both genders. In the BMI categories, the underweight adolescents had the most family meals together with the family, whereas the overweight or obese had the least. A higher use of alcohol and tobacco is associated with less frequent family meals. Those adolescents who had school lunch and breakfasts had more family meals together with the family.

Most of the adolescents who reported communicating often with the parents (Table 5.) had family meals together with the family. Adolescents who hardly ever communicated with their parents had the least family meals together with the family. In other words, the consumption of family meal grew with the communication satisfaction with parents.

Table 5. The proportion (%) of the adolescents' consumption of family meal in the categories describing weight perception, lifestyle and communication satisfaction with parents. School Health Promotion study 2013 (girls n=46 411, boys 46 579).

	Girls			Boys		
	No meal	Prepared, not together	Family meal together	No meal	Prepared, not together	Family meal together
Weight perception						
Perceived clearly overweight	19.3	45.4	35.3	21.4	41.4	37.2
Perceived slightly overweight	12.9	48.1	39.0	11.4	43.1	45.5
Perceived weight normal	9.4	45.8	44.8	8.1	42.6	49.3
Perceived slightly or clearly under	10.4	46.3	43.3	10.0	42.4	47.5
Physical activity						
Once or more than once a day	10.8	46.8	42.4	8.4	43.0	48.6
4-6 times a week	9.4	47.2	43.4	7.8	44.1	48.2
1-3 times a week	11.7	45.8	42.4	9.4	41.3	49.4
Less than once a week or never	18.8	45.8	35.5	17.9	40.5	41.6
BMI[a]						
Normal weight	10.9	46.9	42.2	8.5	42.9	48.5
Underweight	9.3	44.6	46.1	9.1	37.2	53.8
Overweight or obese	12.8	45.6	41.5	11.3	42.3	46.4
Alchohol use						
Once a week or more often	27.2	48.6	24.2	33.1	37.6	29.3
About 1-2 times a month	16.8	52.7	30.6	13.3	49.8	36.8
Not very often	14.0	52.1	33.9	9.9	47.2	42.9
Never	9.1	43.5	47.4	7.6	40.0	52.4
Smoking						
Daily	19.3	52.7	28.0	17.2	46.4	36.4
Once a week or more frequently	15.6	53.3	31.1	9.9	48.3	41.9
Less than once a week	12.8	50.8	36.4	9.3	45.4	45.2
Quit or abstained	13.2	49.4	37.4	9.4	44.9	45.6
Not smoking	9.0	43.9	47.1	7.6	40.4	52.0
School lunch						
5 days a week	9.8	45.4	44.8	8.2	41.7	50.1
3-4 days	12.5	48.8	38.7	9.5	45.0	45.5
1-2 days	14.3	49.3	36.5	12.6	47.1	40.3
Less frequently	19.2	47.1	33.8	20.8	39.7	39.5

Table 5. (continued)

Breakfast						
5 days a week	8.5	43.8	47.7	7.3	39.8	52.9
3-4 days	11.6	49.3	39.1	8.8	48.2	42.9
1-2 days	13.5	50.6	35.9	11.2	47.8	41.0
Less frequently	18.7	50.0	31.4	17.3	44.9	37.8
Communication satisfaction						
Hardly ever	22.8	48.4	28.9	23.1	42.6	34.3
Every so often	13.0	50.8	36.2	10.6	47.9	41.5
Quite often	9.1	47.5	43.4	7.7	43.2	49.1
Often	7.2	38.8	54.0	7.0	35.6	57.4

a Criteria for overweight and obesity: IOTF (Cole and Lobstein, 2012). The criteria for overweight include obesity.

The family meal consumption decreases in the 9th grade, particularly for the girls. Adolescents who lived in a family with two adults (Table 6.) had most the shared family meals, whereas the adolescents who take turns living with each parent had fewer shared family meals. The least family meals had those girls who lived alone with a father. The boys' family meal consumption was also disturbed if living in a one-parent family, however the consumption of family meals was less affected if living with just a father.

The higher educational level of both parents (Table 6.) was associated with the consumption of shared family meals in both genders. Having a highly educated mother had a stronger association on the consumption of family meals more for the boys, whereas a highly educated father had a stronger association on the consumption of family meals more for the girls. In families where both parents were highly educated, the boys benefited more when observing the consumption of family meals; whereas girls of highly educated parents had both, meals prepared alone and shared family meals equally frequently.

Adolescents whose both parents were unemployed (Table 6.) had significantly less family meals than those whose parents were employed. The least family meals were consumed among those adolescents who had unemployed parents. In addition, school success was associated with family meals dined together with the family.

Table 6. The proportion (%) of the adolescents' consumption of family meal in the 8th and 9th grade and in the categories describing the socioeconomic background. School Health Promotion study 2013 (girls n=46 411, boys 46 579).

	Girls			Boys		
	No meal	Prepared, not together	Family meal together	No meal	Prepared, not together	Family meal together
Grade						
8th	10,5	45,4	44,1	9,1	40,9	50,0
9th	12,0	47,7	40,3	9,8	44,3	45,9
Family structure						
Both mother and father	9,1	46,7	44,2	7,9	41,5	50,6
Mother and father in turns	11,5	46,1	42,4	9,4	43,6	47,0
Just mother	19,3	48,5	32,2	15,0	49,7	35,3
Just father	28,2	44,9	26,9	17,9	43,1	39,0
Mother/father and partner	12,9	47,6	39,5	9,9	45,8	44,3
Another family form	17,8	30,9	51,3	22,6	31,7	45,8
Parents education						
Neither high	11,9	46,8	41,3	10,1	42,9	47,0
Father high	10,7	47,9	41,4	8,0	43,5	48,5
Mother high	11,5	47,3	41,2	8,5	42,2	49,2
Both high	8,6	45,7	45,7	7,0	41,3	51,6
Unempl. or redundancy						
Neither parent	10,4	46,5	43,1	8,7	41,9	49,5
Other parent	13,0	46,9	40,1	10,2	45,3	44,5
Both parents	17,0	45,9	37,0	20,1	37,4	42,5
Grade point average						
<6.9	18,4	50,0	31,7	13,8	45,9	40,3
7.0-7.9	13,2	48,0	38,8	9,6	42,5	47,9
8.0-8.9	10,0	45,8	44,2	7,0	41,4	51,6
9.0-10	8,0	44,9	47,1	6,9	40,6	52,5

8. 3 Main results in logistic regression

Consuming family meals together with the family is associated with a normal weight perception (Table 7.). Not consuming family meals at all was strongly associated with perceived under- or overweightness in both genders in the univariate model and the multivariate models. The association of the variable the family *meal prepared, but not eaten together* diminished after the communication satisfaction with parents was added into the model. Therefore, a lower communication satisfaction with parents was associated to under- or overweightness perception in Model 3, the association being slightly stronger for the communication satisfaction with parents than for family meals (Table 7). The association with family meals crew slightly when the variable communication satisfaction with parents was removed from the multivariate model.

For the girls, the association between the PA and the perception of under- or overweightness was not significant in all the categories in the Model 3 (Table 7). Only the physical activity 1-3 times a week was associated to perceived under- or overweightness for the girls. For the boys, lower physical activity was associated to a higher perception of under- or overweightness.

The BMI had the strongest association with perceived under- or overweightness in all the logistic regression models for both genders (Table 7). Major gender differences exist in the association between the BMI and weight perception. Overweightness was predominantly associated to perceived under- or overweightness in girls, whereas for boys, both under- and overweight was associated to perceived under- or overweightness.

For the girls, the increased use of alcohol was associated with the perception of under- or overweightness in all the models (Table 7). For the boys, the category, increased use of alcohol was not associated with perceiving under- or overweightness in the Model 3, which included the variable communication satisfaction. Moreover, increased smoking was associated with the perception of under- or overweightness in all the models for girls only. For the boys, daily smoking and smoking less than once a week lost significance in the Model 3, which included the variable communication satisfaction.

Eating school lunch and breakfast less frequently had an association with a higher perception of under- or overweightness in all the models for both boys and girls (Table 7).

The family structure (Table 7.) was associated with the perceived under- or overweightness; however, some significance was lost when other variables were added into the model. For the girls, the variables living with just a father and in another family form than a nuclear family, were not associated with the perceived under- or overweightness when the variable communication satisfaction was included. Similarly, for the boys, living with just a father was not statistically significantly associated to the perceived under- or overweightness in the with the variable communication satisfaction included in the model.

For the girls, having uneducated parents (Table 7.) and a highly educated father lost significance in the model with the variable communication satisfaction with parents. Therefore, having only a highly educated mother was associated with the perceived under- or overweightness for the girls in the model with the variable communication satisfaction with parents. For the boys, having only a highly educated father had an association with the perceived under- or overweightness. Unemployment was related to the perceived under- or overweightness, with the association being stronger for boys than girls. School success was associated to the perceived under- or overweightness for the girls only.

Table 7. The adolescents weight perception in uni- and multivariate models association with the life style and SES variables. Odds ratio (95% confidence interval) adjusted for all the variables. School Health Promotion study 2013 (n=71 288).

	Girls			Boys		
	OR (95% CI) model 1[a]	**OR (95% CI) model 2[b]**	**OR (95% CI) model 3[c]**	**OR (95% CI) model 1[a]**	**OR (95% CI) model 2[b]**	**OR (95% CI) model 3[c]**
SES variables						
Family structure						
Both mother and father	1.00	1.00	1.00	1.00	1.00	1.00
Monther and father in turns	1.177 (1.104-1.254)	1.098 (1.016-1.186)	1.121 (1.037-1.211)	1.211 (1.137-1.289)	1.145 (1.058-1.238)	1.148 (1.061-1.242)
Just mother	1.346 (1.267-1.431)	1.080 (0.996-1.17)	1.108 (1.022-1.201)	1.369 (1.276-1.468)	1.156 (1.051-1.272)	1.166 (1.059-1.283)
Just father	1.275 (1.099-1.478)	0.844 (0.696-1.024)	0.837 (0.689-1.017)	1.399 (1.224- 1.598)	1.170 (0.98-1.398)	1.178 (0.98- 1.408)
Mother/father and partner	1.422 (1.329-1.521)	1.103 (1.014-1.201)	1.109 (1.018-1.207)	1.331 (1.226-1.445)	1.174 (1.056-1.306)	1.186 (1.067-1.32)
Another family form	1.703 (1.487-1.951)	1.153 (0.964-1.378)	1.107 (0.926-1.325)	2.281 (1.994-2.608)	1.392 (1.136-1.704)	1.307 (1.065-1.606)
Parents education						
Neither high	1.456 (1.386-1.53)	1.062 (1.001-1.126)	1.059 (0.998-1.123)	1.263 (1.198-1.332)	1.007 (0.944-1.075)	1.008 (0.945-1.076)
Father high	1.224 (1.129-1.326)	1.073 (0.979-1.177)	1.069 (0.97- 1.173)	1.255 (1.156-1.363)	1.147 (1.041-1.264)	1.145 (1.039- 1.263)
Mother high	1.317 (1.232-1.407)	1.085 (1.005-1.171)	1.084 (1.004-1.171)	1.174 (1.092-1.263)	1.028 (0.944-1.119)	1.024 (0.94-1.116)
Both high	1.00	1.00	1.00	1.00	1.00	1.00
Unemployment or redundancy						
Neither parent	1.00	1.00	1.00	1.00	1.00	1.00
Other parent	1.307 (1.253-1.364)	1.109 (1.052-1.169)	1.089 (1.033-1.149)	1.249 (1.193-1.308)	1.128 (1.063-1.197)	1.122 (1.057-1.19)
Both parents	1.678 (1.505-1.872)	1.274 (1.112-1.461)	1.225 (1.068-1.406)	1.888 (1.693-2.105)	1.342 (1.152-1.564)	1.322 (1.133-1.542)

Table 7. (continued)

	Girls			Boys		
	OR (95% CI) model 1[a]	**OR (95% CI) model 2[b]**	**OR (95% CI) model 3[c]**	**OR (95% CI) model 1[a]**	**OR (95% CI) model 2[b]**	**OR (95% CI) model 3[c]**
Grade point average						
<6.9	2,646 (2,453-2,853)	1,293 (1,16-1,44)	1,23 (1,103-1,372)	1,529 (1,407-1,663)	0,955 (0,851-1,071)	0,94 (0,837-1,055)
7.0-7.9	2.038 (1.929-2.153)	1.24 (1.154-1.334)	1.188 (1.10- 1.278)	1.296 (1.199-1.401)	0.994 (0.901-1.097)	0.98 (0.888-1.082)
8.0-8.9	1.444 (1.371-1.52)	1.159 (1.09-1.233)	1.121 (1.054-1.193)	1.106 (1.021-1.198)	1.031 (0.937-1.136)	1.021 (0.927-1.125)
9.0-10	1.00	1.00	1.00	1.00	1.00	1.00
Lifestyle variables						
Physical activity						
Once or more than once a day	1.00	1.00	1.00	1.00	1.00	1.00
4-6 times a week	0.994 (0.947-1.043)	1.029 (0.97-1.091)	1.021 (0.962-1.083)	1.217 (1.154-1.284)	1.273 (1.192-1.359)	1.266 (1.185-1.352)
1-3 times a week	1.256 (1.2-1.314)	1.139 (1.077-1.205)	1.111 (1.05-1.176)	1.774 (1.687-1.865)	1.664 (1.563-1.772)	1.651 (1.55-1.758)
Less than once a week or never	1.595 (1.472-1.728)	1.147 (1.035-1.27)	1.079 (0.973-1.196)	2.669 (2.485-2.867)	2.03 (1.842-2.238)	1.941 (1.76- 2.141)
BMI[d]						
Normalweight	1.00	1.00	1.00	1.00	1.00	1.00
Underweight	1.52 (1.426-1.619)	1.594 (1.485-1.712)	1.598 (1.487-1.717)	5.179 (4.709-5.696)	4.936 (4.435-5.492)	4.919 (4.419-5.476)
Overweight or obese	11.435 (10.559-12.382)	12.198 (11.179-13.309)	12.586 (11.528-13.74)	6.109 (5.807-6.426)	5.931 (5.602-6.28)	6.031 (5.694-6.388)
Alchohol use						
Once a week or more often	2.494 (2.114- 2.943)	1.435 (1.15-1.789)	1.352 (1.082-1.688)	2.591 (2.307-2.91)	1.274 (1.053-1.541)	1.175 (0.968-1.426)
About 1-2 times a month	1.58 (1.482-1.684)	1.118 (1.015-1.23)	1.068 (0.969-1.176)	1.067 (0.995-1.144)	0.847 (0.763-0.941)	0.822 (0.74-0.913)
Not very often	1.421 (1.36-1.485)	1.066 (0.999-1.138)	1.038 (0.972-1.109)	0.953 (0.908- 0.999)	0.853 (0.796-0.915)	0.834 (0.778-0.895)
Never	1.00	1.00	1.00	1.00	1.00	1.00

Table 7. (continued)

	Girls			Boys		
	OR (95% CI) model 1[a]	**OR (95% CI) model 2[b]**	**OR (95% CI) model 3[c]**	**OR (95% CI) model 1[a]**	**OR (95% CI) model 2[b]**	**OR (95% CI) model 3[c]**
Smoking						
Daily	1.967 (1.851-2.091)	1.223 (1.105-1.353)	1.19 (1.075-1.317)	1.34 (1.264-1.42)	1.004 (0.908-1.109)	0.982 (0.888- 1.086)
Once a week or more often	1.82 (1.658-1.998)	1.345 (1.187-1.523)	1.269 (1.119-1.438)	1.274 (1.155-1.406)	1.20 (1.052-1.37)	1.162 (1.017-1.327)
Less than once a week	1.579 (1.476-1.688)	1.337 (1.221-1.464)	1.263 (1.153-1.384)	1.091 (1.007-1.183)	1.135 (1.021-1.262)	1.1 (0.989-1.223)
Quit or abstained	1.554 (1.467-1.646)	1.29 (1.195-1.393)	1.239 (1.147-1.339)	1.095 (1.034-1.159)	1.106 (1.023-1.195)	1.084 (1.002-1.172)
Not smoking	1.00	1.00	1.00	1.00	1.00	1.00
School lunch						
5 days a week	1.00	1.00	1.00	1.00	1.00	1.00
3-4 days	1.432 (1.369-1.499)	1.319 (1.247-1.395)	1.275 (1.205-1.349)	1.259 (1.199-1.323)	1.176 (1.104-1.253)	1.157 (1.08- 1.233)
1-2 days	1.803 (1.673-1.942)	1.559 (1.422-1.709)	1.484 (1.353-1.628)	1.468 (1.353-1.594)	1.28 (1.148-1.427)	1.259 (1.129-1.404)
Less frequently	2.532 (2.333-2.748)	2.089 (1.885-2.315)	1.917 (1.729-2.127)	1.834 (1.681-2)	1.194 (1.054-1.354)	1.15 (1.013-1.305)
Breakfast						
5 mornings	1.00	1.00	1.00	1.00	1.00	1.00
3-4 mornings	1.494 (1.419-1.573)	1.274 (1.195-1.358)	1.235 (1.157-1.317)	1.295 (1.224-1.371)	1.184 (1.101-1.273)	1.164 (1.082-1.252)
1-2 mornings	1.756 (1.653-1.865)	1.454 (1.348-1.568)	1.395 (1.293-1.506)	1.427 (1.334-1.527)	1.144 (1.047-1.251)	1.125 (1.029-1.231)
Less frequently	2.257 (2.142-2.378)	1.708 (1.594-1.83)	1.621 (1.512-1.738)	1.699 (1.607-1.796)	1.264 (1.169-1.366)	1.23 (1.137-1.33)

Table 7. (continued)

	Girls			Boys		
	OR (95% CI) model 1[a]	**OR (95% CI) model 2[b]**	**OR (95% CI) model 3[c]**	**OR (95% CI) model 1[a]**	**OR (95% CI) model 2[b]**	**OR (95% CI) model 3[c]**
Family meals						
No meal. everyone help themselves	1.657 (1.557-1.763)	1.283 (1.186-1.387)	1.156 (1.068-1.252)	1.643 (1.535-1.758)	1.339 (1.222-1.467)	1.258 (1.147-1.38)
Meal prepared. not dined together	1.185 (1.14-1.233)	1.084 (1.033-1.138)	1.03 (0.98-1.082)	1.094 (1.049-1.141)	1.058 (1.002-1.116)	1.026 (0.972-1.083)
Family meal dined together	1.00	1.00	1.00	1.00	1.00	1.00
Communication satisfaction						
Hardly ever	3.201 (2.975-3.444)		2.469 (2.251-2.709)	2.381 (2.192-2.586)		2.112 (1.884-2.367)
Every so often	1.876 (1.785-1.972)		1.658 (1.557-1.765)	1.322 (1.254-1.393)		1.348 (1.259-1.444)
Quite often	1.307 (1.241-1.376)		1.263 (1.185-1.346)	1.105 (1.049-1.164)		1.201 (1.124-1.283)
Often	1.00		1.00	1.00		1.00

a Model 1: Univariate model
b Model 2: Multivariate model without Communication satisfaction with parents
c Model 3: Multivariate model with Communication satisfaction with parents
d Criteria for overweight and obesity: IOTF (Cole and Lobstein, 2012). The criteria for overweight include obesity.

9. DISCUSSION

9.1 Main findings

The literature review described the selected family meal and weight perception determinants in adolescence. It also described the relationship between family meals, communication satisfaction with parents and weight perception based on information from previous research.

The motivation of this research was to find out whether the family meals, the communication satisfaction with parents and the weight perception are related with each other. What emerged was that having no family meal was associated with the under- or overweightness perception, and hardly ever communicating with parents may explain the under- or overweightness perception more than having no family meal. Therefore, the association of the communication satisfaction with parents seem to influence weight perception more than the family meal. In spite of that, the family meal is not the descriptive variable alone. The respondents with a normal weight perception had more shared family meals and experienced more communication satisfaction with parents. Therefore, the quality of the communication with parents during the family meals may affect or assist adolescents weight perception.

This research disclosed that the weight perception of adolescents who eat shared family meal often differed from those who had *no family meal*. Nevertheless, the communication satisfaction with parents may explain the association, since the association of the family meals to the perception of under- or overweightness decreased after it was added into the analysis. Moreover, the association of *meal prepared, but not dined together* to the perception of under- or overweightness vanished after the communication satisfaction with parents was taken into account. Therefore, the communication satisfaction with parents may further justify the adolescents weight perception. All in all, the adolescents who had no family meals and helped themselves to food, reported higher perception of under- or overweightness.

9.2 Limitations and Strengths

9.21 Data Re-examination

The SHP study has ethical approval and the questionnaire is not forced upon adolescents. A consent form from the parents was not needed. Other research used a survey that needed parent's consent (Berge et al. 2013, Utter et al. 2013a), which may alter their results.

The cross-sectional design of this research limits the ability to make causal inferences. The direction of causality cannot be supposed, therefore it is not recognised whether family meals initiated the normal weight perception or not. Cross-sectional studies are different to longitudinal studies, since the cross-sectional study only gathers information at one moment in time. The longitudinal studies gather data from the individuals across multiple periods of time, and they allow the long-term assessment of the impact of the family mealtimes (Musick and Meier, 2012).

Another limitation of this data was the reliability of the information provided in the self-reported questionnaire. Furthermore, potential difficulties with the content validity may exist with the respondents' interpretation of the questions. For example, the weight and height may be incorrectly reported (Kaltiala-Heino et al., 2003; Kautiainen et al., 2002) and parent's education may not be recalled.

Due to the large sample size, it is easy to achieve statistical significance with analytical tests. Nevertheless, large self-reported surveys remain more convenient, economical and efficient in population research. The response rate was high (Terveyden ja Hyvinvoinnin Laitos, 2015) in a large sample size, therefore the results can be generalised within the same population group. While the study population is large, it is not a random sample of all the adolescents in Finland.

Due to the gender differences in the reporting, the analyses were made independently for both genders. The students who were absent from the class by the time of the survey may be different to those who participated. According to Mikkilä et al. (2003), the boys who are absent may have been from a lower SES, however gender differences may be

due to the gender difference in reporting. Therefore, gender differences in the SES may incompletely demonstrate gender differences in reporting.

9.22 Methods Re-examination

A re-examination of the methods compared to the Mikkilä's et al. (2003) research, in which used the data of the 1997 SHP study was used, are scanned next. This study attempted to use the same background variables than Mikkilä. The repetition of the Mikkilä's research on weight perception and family meals was incomplete, since several questions had changed since then. In the following chapter, some challenges are explained in detail. Nevertheless, background variables remained nearly equivalent, yet Mikkilä did not question the *communication satisfaction with parents*, which was examined in this study. Therefore, the results are not completely comparable. Looking at method similarities, the current research used the same age restriction. The following questions remained the same: the weight perception, family meal, breakfast, educational level of the parent and grade point average (Mikkilä's et al., 2003).

The response variable in the logistic regression models was dichotomous. Therefore, the perceived overweightness, which includes major gender differences, is not seen in the logistic regression model that requires dichotomous variables. A model that permits the measurement of weight perception accuracy would deliver more detailed results on the weight perception. However, the purpose of this study was to see other than normal perception of weight and not to examine the weight perception accuracy. Moreover, the current study is cross-sectional design; therefore the adolescents' under- or overweightness perception of body weight may not be a result of not having a family meal or vice versa. It is pertinent to consider whether it is possible that under- or overweightness perception could associate with wish to eat less of family meals and less desire to talk with the parents. This research cannot tell which one of the variables existed first.

Thereafter, as a potential confounder, the SES variables were used in the analysis. Prior research results on family meals were similar, even though the own social status of the adolescents or the social position of the parents was taken into account. The current study concentrated on one personal social position indicator (self-reported school

achievement) and two parental social position indicators (employment status, education level). Mikkilä's et al. (2003) research on weight perception used 'Economic situation of the family' (good, some problems, severe problems). Instead of the variable 'Economic situation of the family', the variable 'Unemployment' was used, since the question did not exist in the current 2013 survey. However, there may be remaining confounding since the information on household income was not available, as was in the Mikkilä's (2003) research.

Furthermore, the question on the family structure was changed since 1997 and one more category was used. The answering option '*Mother and father in turns, my parents do not live together'* answering option was not used in 1997. Mikkilä (2003) excluded those who lived with their spouse or a partner from the research. In this data set, there was no such answering option as living with a partner. Alternatively, those who answered '*Living with another adult or adults'* and '*I live in another way*', were combined due to a low number of responses numbers.

Additionally, the following food and meal questions had changed since Mikkilä et al. (2003). The question asking about school lunch variable was changed from the survey in 1997 (Mikkilä et al., 2003): 'Which of the following options best describes your school lunch?' was not asked in 2013. Therefore, another lunch question was used and additional food choices were left out of the study as follows.

Mikkilä et al. (2003) standardised also the consumption of fast-food, healthy food and traditional food, which the current research failed to do. The entire food behaviour in the SHP-questionnaire had changed since 1997, therefore none of the grocery groups including 18 items that Mikkilä et al. (2003) used, were used in the current study. The groceries included fast food, beverages, sweets and snacks (Mikkilä et al., 2003). Only the intake of 'fruit and berries' and 'fresh or boiled vegetables' were asked in the 2013 SHP-questionnaire, compared to the 1997 questionnaire that had answering options for unhealthy food as well. None of these were used in the current study.

Furthermore, instead of asking the energy expenditure of the adolescents, only the frequency of exercise is taken into account to examine the adolescents' health behaviour. For instance, active travelling to/from school and sedentary behaviour was

not taken into account. There were other PA questions in the SHP study. However, instead of the energy expenditure the current analysis wanted to describe the life style. For example, Mikkilä (2003) used question about alcohol, which was different to the question in the current study.

The current analyses controlled for a self-reported weight and height category, as was done in Mikkilä et al. (2003) research. The BMI was calculated differently to Mikkilä et al. (2003) study, which used SHP study's internal relative weight. Therefore, Mikkilä et al. (2003) research identified only Finnish adolescents overweightness. The current study used international IOTF BMI cut-offs (Cole and Lobstein 2012) instead. Nevertheless, the BMI remains statistically as the most significant association to weight perception, presenting the strongest association of all the background variables. Moreover, Mikkilä et al. (2003) found that weight perception was more significant than self-reported weight in the obesity related study.

A re-examination of the methods beyond the comparison to Mikkilä et al. (2003) are considered next. The limitations must be kept in mind when interpreting the current study, since the BMI is counted based on a self-reported weight and height in the current study. Some research announces that limitations such as self-reported weight will undermine the validity of the studies (Yost et al., 2010). Additionally, the criteria for overweight and obesity vary between studies (Kautiainen, 2008; Mikkilä et al., 2003; Sweeting, 2007) and stating that adolescents are overweight or obese is perplexed, since there is no unchanging definition of obesity.

In addition, the gender differences in reporting may have resulted in the more honest reporting of overweightness in boys (Luopa et al., 2014), thus this may have affected the results. However, this study did not measure the weight perception accuracy and used the BMI only as a background variable. Regarding the BMI, it is often over or understated (Kaltiala-Heino et al., 2003; Kautiainen et al., 2002) and gender differences exist in the reporting of weight (Kautiainen et al., 2002). Therefore, the BMI is not a definite measure. In addition, adolescents' physical development varies and therefore the adult BMI measures may not function for the adolescents. Accordingly, the current research adjusted the adult BMI to suit adolescents, referring to the Cole and Lobstein (2012) age adjusted IOTF BMI cut-off points for thinness, overweight and obesity.

Furthermore, the self-reported weight and height are non-invasive ways of measurement (Kautiainen, 2008), although the validity has been questioned (Kaltiala-Heino et al., 2003).

Looking at the other research in the literature review, studies measured different background variables, thus none were identical to this research. Methodologically, Musick and Meier (2012) implemented a more systematic longitudinal method that was not used in the current cross-sectional research. Subsequently, there is no follow up, therefore it is not known which one existed first: the family meal or the perception of weight. Furthermore, Musick and Meier (2012) discussed that it is difficult to separate family mealtime benefits from the other variables in the family environment.

In addition, the family meal times are challenging to define. For example, to some adolescents an evening snack may stand as family meal. Adolescent's family meal consumption may depend on other variables, such as snacking during the day. The SHP study question for family meals did not define whether a weekday or weekend is proposed, which may confuse the respondents. Some adolescents may not have family meals during the week, although prolonged family meals on the weekends may compensate that. Some research measured the family meal variable continuously (Musick and Meier, 2012), other categorically (Fulkerson et al., 2006), where as another experimentally (Offer, 2013). Therefore, the research studies are not directly comparable.

Furthermore, potential confounders, such as mood that could affect the state of weight perception should be measured and adjusted more effectively (Utter et al., 2013a). Mood was not taken into consideration in this study. In addition, communication satisfaction with parents is measured with only one question in the SHP study. Family communication could be measured further than was done in the current study. For example, family's interaction within social media and via mobile messaging could be measured. The perceived *communication satisfaction with parents* may or may not reveal the overall care, guidance and support received from the parents. However, larger studies exist, which analyse the parent-child relationship with in detailed aspects of the family environment (Musick and Meier, 2012). Al Sabbah et al. (2009) proposed that the importance of the quality and the quantity of the contact between the parent and the

adolescent should be evaluated. The current data did not permit an in-depth exploration of these variables.

In addition, peer support other than the family may associate with how one perceives his or her weight. Other peer support was not included in the current study, although friendships were queried in the survey. The qualities of the family relationships, the quality of the parent-child relationship, other activities with parents, arguments with parents, or the extent of parental control were not controlled (Musick and Meier, 2012). In addition, the current study did not control for family support such as parental involvement at school, family rules and boundaries, or positive adult role modelling (Fulkerson et al., 2006).

Finally, more complex family functioning scales, than just communication satisfaction with parents, have had high validity and reliability in testing (Berge et al., 2013). These measures complete multifaceted testing that considers racial, ethnical and socioeconomically diverse populations (Berge et al., 2013). In addition, the previous research used three different measuring scales that have been found to correlate highly with one another (Berge et al., 2013). In comparison, the current research applied only one question on communication satisfaction with parents and parental monitoring was not evaluated. Complete family interaction scales provide detailed measuring.

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9.3 Comparison to previous literature

Firstly, the purpose of this chapter is to compare the current results to Mikkilä's et al. (2003) results. The comparison results to Mikkilä et al. (2003) showed similarities, as well as differences. In the previous study, weight dissatisfaction was associated with not eating school lunch and evening meals at home for both genders (Mikkilä et al., 2003) and the current study repeated that result.

In addition to Mikkilä et al., (2003), the current findings showed that the significance of *meal prepared, but not dined together* diminished when the variable communication satisfaction was added to the analysis. In Mikkilä's et al. (2003) results, all the family

meal categories were associated to the under- or overweightness perception, however, the analysis did not include the communication satisfaction with parents. According to the current research, the family meals alone do not explain a normal weight perception. Looking at the family meals that were prepared, but not dined together, the association diminished after the communication with parents was added. Therefore, the communication satisfaction with parents may explain the weight perception more than family meals. However, a normal weight perception synchronises with the main exposure agent family meals similarly to Mikkilä's et al., (2003) results, yet the course of the association cannot be defined.

Looking at the difference to Mikkilä's et al. (2003) research, the current research presented that the communication with parents was statistically significantly more related to the weight perception than the family meals. The variable hardly ever communicating with parents had a higher association to under- or overweightness perception than the variable *no meal, everyone helped themselves to food*. This indicates that not communicating with parents is more significant for a distorted weight perception than no family meals at all.

However, the variable *no meal, everyone helped themselves to food* is associated to perceived under- or overweightness in both genders, more so for the boys. Compared to the results of Mikkilä's et al. (2003), the association of the *no family meals* was higher for the boys. However, studies are not totally comparable due to a change of questions. In Mikkilä's et al. (2003) research, *no family meal was* slightly more associated to weight dissatisfaction in girls than boys. In comparison to the current study, *no meal, everyone helped themselves* was more associated to perceived under- or overweightness in boys. *Meal prepared, but nor dined together*-association vanished after the communication satisfaction was added to the model. In Mikkilä's et al. (2003) research, the association of *meal prepared, but not dined together with the family* association was significant.

It seems that the boys are affected more by the *no family meal* compared to the girls, whereas the girls seem to be affected more by the *communication satisfaction with parents*. However, the entire adolescent population may enquire more communication with parents, thus interaction is important during the meals. Corresponding to the

findings of Mikkilä et al. (2003), the weight perception seems to forecast weakened food behaviors. Correspondingly, the current research results demonstrate that the adolescents who perceived under- or overweightness neglect also school lunch and family meal.

Regarding the BMI association to the weight perception, there is a major gender difference in both of the studies. The girls' overweightness was associated to the perception of under- or overweightness twice as often than the boys. Girls report more weight related dissatisfaction or their weight perception is more affected by under- or overweightness. Mikkilä et al. (2003) has a similar large difference between the genders when studying the relationship between the BMI and weight perception. Although Mikkilä's et al. (2003) result is not completely comparable to this research, it seems that the association of the girls' BMI association to the perception of under- or overweightness has increased. The association of the boys' BMI association to the weight perception stayed nearly identical.

Out of the lifestyle variables, the PA is more associated to the weight perception in boys, thus PA assembled weight perception for boys in both studies. Moreover, the frequent use of alcohol was not associated to the distorted weight perception in the main analysis of the prior study (Mikkilä et al., 2003). However, the current study found that the frequent use of alcohol is associated to the under- or overweightness perception, especially for girls. Regular smoking was associated to weight dissatisfaction earlier only for girls (Mikkilä et al., 2003), whereas for now the association was found for boys in two smoking categories.

On behalf of the SES variables, the association between the family structure and the perception of under- or overweightness diminished in the multivariate models as expected. Interestingly, after adding the communication satisfaction into the model, the association of the living with *just mother* ascended for the girls. *Living with just a father* was not associated to weight perception in neither gender, which indicated that fathers' influence on weight perception was lower than the mothers'. However, living with just father was associated to girls' low consumption of family meals. In Mikkilä's et al. (2003) research, the family structure was not associated to weight perception.

Parents' unemployment seems to affect boys weight perception more than the girls' in both of the studies. These results support previous research on weight and weight perception (Mikkilä et al., 2003). Conversely, school success was not related to weight perception in neither of the studies for boys, whereas a low grade point average was related to under -or overweightness perception in both studies for girls.

The educational level of the parents was previously associated to weight perception in the girls only (Mikkilä et al., 2003). However, in the current research only the mothers high level of education was related to the under- or overweightness perception in girls. For the boys, only the fathers high level of education was related to the under- or overweightness perception. Therefore, the adolescents weight perception appears to be affected by the same gender parent's higher level of educational.

Secondly, the purpose of this chapter is to compare the current results to other research results (other than Mikkilä et al. 2003). A previous study found an association between a normal weight perception and communication satisfaction with parents (Al Sabbah et al., 2009). An international study has found an association with adolescents weight perception and the communication satisfaction with parents in many countries; however, the family meal was not included in the mentioned study. Finnish boys weight dissatisfaction was not associated to the communication with parents, whereas significance was found for Finnish girls (Al Sabbah et al., 2009). The findings of the Finnish adolescents contradict to the results in other countries that demonstrate a connection between the weight perception and communication satisfaction with parents in both genders. Al Sabbah et al. (2009) concluded that especially the difficulties' talking to the father are associated to weight perception in both genders. The current study did not research the individual communication satisfaction with parents.

The current results align with the several earlier studies that found an association between the frequent family meals and the communication satisfaction with parents (Berge et al. 2010; Eisenberg et al., 2004; Fulkerson et al., 2010). A research indicates that both genders benefit from open communication during family meals (Utter et al. 2013a) and the current results support these study findings.

9.4 Potential explanations

Adolescents who report communication satisfaction with parents report more normal weight perception and they ate family meals together with the family. Research indicates that the adolescents who communicate with parents and also eat family meals may engage in healthier behaviours in general (Utter et al., 2013a). Family meals may also result in improved psychological and social health in adolescence (Eisenberg et al., 2004; Fulkerson et al., 2006). Therefore, the communication within the family may explain the more frequent family meals (Berge et al., 2013; Utter et al., 2013a) that are associated to a normal weight perception. Comfortable communication within families may signify easier family dining together.

According to the results in the current research, the highly educated mothers affect girls' weight perception, whereas highly educated fathers affect the boys' weight perception. Possible explanations to this outcome are that highly educated parents are more aware of the weight issues and may intrusively influence the opposite gender adolescents; or in turn, criticise their weight. Therefore, the communication concerning adolescent's weight is not efficient. Convicting adolescents on personal weight may only message negligence and sentence a distorted weight perception (Levin et al., 2012b). Similarly, over encouragement in weight issues may cause over-consciousness of the weight (Hayward et al., 2014). Therefore, parental interference with weight may result in groundless weight concern (Levin et al., 2012b).

Those adolescents who perceived a higher family function are also physically more active and have meals together with the family (Berge et al., 2013). Correspondingly, the high PA level was associated with the normal weight perception for the boys in the current study. However, the girls who exercised the most had less family meals compared to those who exercised little less. This may be due to the rushed exercising schedules and lack of time for family meals.

For the girls, the sense of belonging and comfort offered during the meals (Fulkerson et al., 2009; Offer, 2013; Utter et al., 2013a) may enhance the self-perception of weight.

The current research results show that girls' weight perception is disturbed by poor communication satisfaction with parents more than the boys'.

Furthermore, taking into account that the BMI is reportedly a strong indicator for the weight perception (Mikkilä et al., 2003), the influence of the BMI on this outcome cannot be ignored. The BMI remains as a strong indicator for weight perception. After controlling for the BMI, the positive association between the under- or overweightness perception and low family meal consumption remained significant. However, normal weight adolescents are most satisfied with their weight (Mikkilä et al., 2003) and the BMI shows the clearest association also in the current study.

Finnish adolescents ate infrequent evening family meals together with the family (Mikkilä et al., 2003; Ministry of Youth Development, 2014; National Institute for Health and Welfare, 2014). The current results confirm that although school lunch is available in Finland, adolescents who perceived weight other than normal ate less of both of them, the school lunch and family meals. Guardians may rely on free school lunch as a main meal for the day and believe that adolescents eat at school, while they may skip the meal.

According to the Ministry of Youth Development (2014), the PISA study showed that adolescents in other countries ate family meals more often than Finnish adolescents, however the original reference was not available anymore. Finnish adolescents may be expected to be independent earlier than in other cultures and they eat the meals self-reliantly. Consequently, Luopa's et al. (2014) research discovered immense regional differences in adolescents' family meal patterns. Nevertheless, providing a family meal during the week is important for adolescents due to the simultaneous monitoring, debriefing, and communication (Utter et al., 2013a). Therefore, family meals are indispensable in adolescence.

This research disclosed that unemployment and redundancy might affect family meals and adolescents' weight perception. Adolescents who report more health problems, report also higher unemployment rates (Luopa et al., 2014). Therefore, the regions with higher reported unemployment require support to guarantee the equal opportunities for family meals. On the other hand, the capital region in Finland had the lowest family

meal rates (Luopa et al., 2014). Therefore, the hurried life-style in the cities may imply family meal deficit. According to the results, having highly educated parents have a positive impact on the boys' consumption of the family meals more than the girls. Therefore, the high educational level of the parent doesn't necessarily guarantee shared family meals.

Furthermore, family meal can be a reassuring experience for adolescents. In particular, the family meal may ensure the sense of belonging. Berge et al. (2013) explained the findings with the family systems theory; an adolescent lives within a family setting that forms behaviours and understanding on health. On the contrary, an adolescent is susceptible to risk behaviours in family with less rules and communication (Berge et al., 2010).

Parenting may not explain the overall impact of the family behaviours that influence adolescent weight conduct (Berge et al., 2013), however adolescents respond to parents food habits (Kremers et al., 2003). Prior studies associated family meals to the communication satisfaction (Berge et al., 2010; Fulkerson et al., 2010; Levin et al., 2012a; Musher-Eizenman and Kiefner, 2013) and family functioning was associated to more frequent family meals in adolescence no matter what the culture is (Berge et al., 2013). However, the communication during the family meals differs between cultures.

Analogously, adolescents risk behaviours are connected to the lack of family meals (Eisenberg et al., 2008; Fulkerson et al., 2010; Levin et al., 2012b; Mure et al., 2014) and neglectful parenting to fewer family meals (Berge et al., 2010). Consequently, the organisation within families indicate frequent family meals (Berge et al., 2013), therefore families may require assistance with constructing the family meals. The research found that an authoritative parenting style that values communication was associated to frequent family meals in adolescence (Berge et al., 2010). Therefore, encouraging parents may prevent meal skipping.

Perceived physical, psychological and social strength affect adolescents health (Välimaa, 2000), therefore a consideration of all these actors is required. Adolescent's physically changing body requires a new definition of self, thus dieting related conversations at home or in the media may confuse the weight perception (Ojala et al.,

2012). An adolescent justifies his or her health also by the social support (Välimaa, 2000), thus family meals are a demonstrating encouragement for the adolescents. The sense of belonging that a family meal proposes may explain better health outcomes. The early independence in adolescence may increase the omitting of family meals (Videon and Manning, 2003), and therefore an appeal for shared family meals may prevent meal skipping (Berge et al., 2010).

9.5 Implications and Public Health Relevance

According to the results, the association of the family meals to adolescents' normal weight perception prospected the family meals to promote adolescents health. A normal weight perception is related to a better body image in adolescence (Eaton et al., 2005; O'Dea and Amy, 2011; Perrin et al., 2010; Viner et al., 2006), and therefore also to fewer problems related to weight.

Parents offer the contextual environment for adolescents and the family meal is a useful health promotion tool. Participation in personal health development needs to be maintained in adolescents' own growing environment (Ministry of Social Affairs and Health, 2011). Moreover, a favourable family meal environment fosters healthy meal patterns (Hammond and Fiese, 2011; Neumark-Sztainer et al., 2003; Utter et al., 2012b) and may facilitate realistic weight attitudes (Mikkilä et al., 2003).

The significance of this study is to improve the public understanding of the role of family meals on adolescent's weight perception. An incorrect interference in the weight perception obstructs the self-image of adolescents (Hayward et al., 2014; Ojala et al., 2012), thus interventions must comprehend adolescent's weight-outlook (Välimaa, 2000). A healthy self-esteem is conceivable during the family meal (Utter et al., 2013a) and therefore family meals may prevent inaccurate weight perceptions (Eisenberg et al., 2004; Fulkerson et al., 2006; Mikkilä et al., 2003). On the contrary, contentious family meal may induce other than normal perception of weight.

In addition, the current results and Mikkilä et al. (2003) demonstrate that adolescent's socioeconomic environment affects their family meals consumption and the perception of weight. Goldfarb et al., (2014) stated that nuclear families consume more family meals together. Correspondingly, the current study presented that the adolescents from nuclear families have the most family meals; therefore the family structure is significant in adolescents' family meal consumption.

Furthermore, family meal promotion must also take lower social classes into account. The adolescents' 8th grade family health check and mental health support (Ministry of Social Affairs and Health, 2011) could help to recognise family meal deficit. A poor weight perception is a subtle mental health issue in adolescence (Al Sabbah et al., 2009) that can be associated with the insufficient family meals. Therefore, the shared family meals that are associated to normal weight perception (Mikkilä et al., 2003) must be queried systematically via health checks on adolescents, as a part of the family health assessment. Health checks should identify the need for special support early enough (Ministry of Social Affairs and Health, 2011) and therefore health care providers are required to question family nutrition (Berge et al., 2010). Moreover, availability of the shared family meals is substantial, not necessarily the quality of them.

It is significant to raise adolescents' health to a high value. Finnish adolescents ate fewer family meals compared to other developed countries (Ministry of Youth Development, 2014). Looking at the adolescents' family meal rates in Finland (Luopa et al. 2014), the families need encouragement in taking part in shared family meals. In order for adolescents to eat regular family meals, a direct meal advice is required to mobilise the families. Certain cultures with higher family functioning appear to offer more frequent family meals (Berge et al., 2013).

Reaching every adolescent and families outside of the health and social services is recommended (Ministry of Social Affairs and Health, 2011). Therefore, the family meal promotion may benefit families that are outside those services. Family meal endorsements for families and health care professionals may recover family meal regularity, which can improve adolescents weight perception. Correspondingly, restoring adolescents' weight perception require shared responsibility, including parents, health care professionals, the food industry and governmental bodies.

Currently, Finnish adolescents need support in maintaining regular family meals. Health promoters can coach consumers in healthy eating conventions, yet the recommendations must adjust to the practices and distinctive needs of the adolescents (Ministry of Social Affairs and Health, 2011). It is apposite to mention the gender disparities in family meal consumption that need adjustment. Boys report having more family meals over the girls (Berge et al., 2013; Mikkilä et al. 2003) and the current research found reoccurrence. This may be due to gender differences in reporting. However, girls who also report more distorted weight perception, may require shared family meal times.

Overall, this research encourages shared family meals for adolescents and model eating at home together with family. Family functioning refers to structural and organizational properties, as well as to abilities to interact as a group (Berge et al., 2013). The family meal not only offers routine (Musick and Meier, 2012), but also may set a worthy foundation for a healthy weight perception. Parents are responsible for meal modelling and a nutritious environment (Berge et al., 2010). Regular family meal times are proposed, although family life is hectic. Alternatively, a shared evening snack may substitute for the shared family meal. Simple evening meal methods contribute to easy family meal patterns. The use of convenience food does not signify failed parenting, as long as the meals are eaten together. All in moderation is a key for good family meal.

Furthermore, family meals offer participation potential for adolescents to involve in their personal nutrition. Therefore, the shared family meal preparation can be boosted via a family meal promotion that includes preparation methods. Extending parents' family meal organisation skills may promote normal weight perception for adolescents. Research indicates that family meals provide an important opportunity for adolescents to consume healthy food, involve in cooking and share life-experiences via meal times (Utter et al., 2013a; Berge et al., 2013). Family meal promotion can educate families on family communication and pledge for shared dining experiences with adolescents.

9.6 Conclusions

The primary aim of this thesis was to examine whether family meals are associated with weight perception among adolescents in Finland. Accordingly, shared family meal consumption may recover the normal weight perception. Communication satisfaction with parents is associated to both, the shared family meals and normal weight perception. It is pertinent to consider that the association of communication satisfaction with parents to the normal weight perception was stronger than of the family meals. An overview of this research indicates that although the family meal cannot be used as a single preventative strategy for distorted weight perception, the benefits of the family meal for a normal weight perception are promising.

Adolescents' perception of health needs to be understood (Välimaa, 2000) in order for the nutritional health promotion to work. Endeavors in adolescence, such as decent family conditions and pronounced meals provide opportunity to consume healthy meals, whereas the disparities within the nourishment conditions seem to affect the adolescents' weigh perception. This research presented that the family's low SES background may affect weight perception.

Nevertheless, families have potential to regenerate a family meal tradition in the future. Public perceptions may need re-examining in order to improve adolescents' weight perception and to increase their family meal intake. More attention must be paid to the role of the parents as persons who influence the adolescent's family meal habits. Sharing family mealtimes regularly and valued parent-adolescent communication may enhance the normal weight perception.

Moreover, future research on the role of the parents in adolescents' weight-related health is required. Assessing potential mediators, such as rules for eating at home, are required. Further qualitative research in family meals, family communication practices and adolescents weight perception could clarify the association. Finally, a longitudinal analysis would evaluate the temporal effects related to weight perception, family interaction and family meals.

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